

2004

# Washington University School of Medicine bulletin, 2004

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***BULLETIN OF WASHINGTON UNIVERSITY***

***St. Louis, Missouri***

***School of Medicine***

***August 4, 2004***

## Calendar

### Calendar 2004-2005

#### **2004**

##### **June**

- 18 **Friday:** Clinic orientation for third-year students.  
21 **Monday:** Academic year begins for the third- and fourth-year classes.  
25 **Friday:** Deadline for registration and initial payment of tuition for the third- and fourth-year classes.

##### **July**

- 5 **Monday:** Independence Day observance.

##### **August**

- 10 **Tuesday:** Orientation, matriculation and initial fee payment for the first-year class.  
16 **Monday:** Academic year begins for the first- and second-year classes.  
20 **Friday:** Deadline for registration and initial payment of tuition for the second-year class.

##### **September**

- 6 **Monday:** Labor Day observance.

##### **October**

- 21 **Thursday:** Danforth Symposium; no classes beyond noon for first- or second-year students.

##### **November**

- 25 **Thursday:** Thanksgiving Day observance.  
26 **Friday:** Holiday for first- and second-year classes.

##### **December**

- 18 **Saturday:** Winter recess begins at 1 p.m. for all classes.

#### **2005**

##### **January**

- 3 **Monday:** Winter recess ends at 8 a.m. for all classes.  
7 **Friday:** Deadline for payment of the balance of tuition for all classes.  
17 **Monday:** Martin Luther King, Jr. Day observance.

##### **March**

- 27 **Sunday:** Spring recess begins for the first- and second-year classes.

##### **April**

- 1 **Friday:** Spring recess begins at 8 a.m. for the third- and fourth-year classes.  
4 **Monday:** Classes resume for all classes.

##### **May**

- 6 **Friday:** Merit Scholarship activities.  
7 **Saturday:** Merit Scholarship activities.  
8 **Sunday:** Academic year ends at 5 p.m. for the graduating students.  
13 **Friday:** Academic year ends at 5 p.m. for the second-year class.  
20 **Friday:** Commencement.  
27 **Friday:** Academic year ends at 5 p.m. for the first-year class.  
30 **Monday:** Memorial Day observance.

## June

- 3     **Friday:** Clinical clerkships end at 5 p.m.  
      **Friday:** Doctoring Retreat begins for students in Clinical Clerkships.
- 9     **Thursday:** Doctoring Retreat ends at 5 p.m. for students in Clinical Clerkships.  
      **Thursday:** Academic year ends at 5 p.m. for students in Clinical Clerkships.

## Schedule of Clerkship and Elective Intervals

### Weeks Dates

- 1-4:    June 21, 2004 - July 18, 2004  
5-8:    July 19, 2004 - August 15, 2004  
9-12:   August 16, 2004 - September 12, 2004  
13-16:   September 13, 2004 - October 10, 2004  
17-20:   October 11, 2004 - November 7, 2004  
21-24:   November 8, 2004 - December 5, 2004  
25-28:   December 6, 2004 - January 16, 2005 (Winter recess December 18, 2004, through January 2, 2005)  
29-32:   January 17, 2005 - February 13, 2005  
33-36:   February 14, 2005 - March 13, 2005  
37-40:   March 14, 2005 - April 10, 2005  
41-44:   April 11, 2005 - May 8, 2005  
45-48:   May 9, 2005 - June 5, 2005\* (clerkships only)

\*Clinical clerkships end June 3, 2004; Doctoring retreat begins for students in clinical clerkships.

Final examinations for clinical clerkships are administered at the end of each clerkship. Exact date, time and location are announced by the coursemaster.

## **Admissions and Educational Program**

### **Admissions and Educational Program**

#### **Mission Statement for Washington University**

The mission of Washington University is the promotion of learning — learning by students and by faculty. Teaching, the transmission of knowledge, is central to our mission, as is research, the creation of new knowledge. Faculty composed of scholars, scientists, artists and members of the learned professions serve society by teaching; by adding to the store of human art, understanding, and wisdom; and by providing direct services such as health care.

Our goals are:

- to foster excellence in our teaching, research, scholarship and service;
- to prepare students with the attitudes, skills and habits of lifelong learning and with leadership skills, enabling them to be useful members of a global society; and
- to be an exemplary institution in our home community, St. Louis, as well as in the nation and the world.

To this end we intend:

- to judge ourselves by the most demanding standards;
- to attract people of great ability from all types of backgrounds;
- to encourage faculty and students to be bold, independent and creative thinkers; and
- to provide the infrastructure to support teaching, research, scholarship and service for the present and for future generations. Our institution is committed to the philosophy that teaching and research are best conducted in facilities where dedication to safety, health, and environmental stewardship is exemplary.

#### **Objectives of the Educational Program for Medical Students**

Washington University School of Medicine provides students with a supportive, stimulating and challenging environment in which to acquire a thorough foundation in scientific medicine and develop skills, professional attitudes and personal commitments necessary for the practice of medicine at the highest possible level of excellence. In addition, the medical school fosters a commitment to collegiality, respect of individuality, community involvement and leadership through many extracurricular organizations and activities supported by the school. The educational program is designed to ensure that each graduating student will demonstrate the following:

- Knowledge of core concepts and principles of human biology.
- Knowledge of the scientific foundations of medicine and medical practice including disease pathogenesis and treatment, illness prevention and health maintenance.
- Proficiency in applying the scientific method to the practice of medicine including the processes of problem identification, data collection, hypothesis formulation and the application of deductive reasoning to clinical problem-solving.
- Knowledge of human behavior and an understanding of the impact of ethnic and cultural characteristics, socioeconomic factors, and other social factors on the practice of medicine.
- Proficiency in obtaining an appropriate medical history, performing a physical examination, and performing basic procedures necessary for the practice of medicine.
- Cognitive skills essential to the formulation of clinical questions, critical evaluation of scientific and clinical data, and effective application of this data to clinical problem-solving.
- Efficient and effective utilization of educational resources, and proficiency in acquisition and assimilation of new information and practices.
- Recognition of uncertainty in clinical decision-making and current medical practices and an appreciation of the need to discard and replace obsolete information and practices.
- Effective oral and written communication skills with patients and their families, members of the academic and medical communities, and other members of the community at large.
- Commitment to provide compassionate care for all people.
- Dedication to inquiry and to life-long learning through self-education and self-assessment, and active participation as teachers of patients, colleagues and members of the community.
- Appreciation of the essential role of biomedical research in the advancement of medicine and a commitment to the spirit of collaboration and support of basic science and clinical research efforts.
- Dedication to high standards of professional integrity and ethical behavior in clinical practice and biomedical research.

## ***Description of Undergraduate Medical Education Program by Year***

### **First Year**

The first-year curriculum focuses on the acquisition of a core knowledge of human biology, as well as on an introduction to the essentials of good patient care. Diversity among matriculants in undergraduate background, and in approaches to learning, is recognized and fostered. The courses are graded Pass/Fail, and a variety of didactic means are made available including lectures, small groups, extensive course syllabi, clinical correlations, and a Lotus Notes computerized curriculum database. The Practice of Medicine I uses regular patient interactions and integrative cases to teach students to skillfully interview and examine patients, as well as the fundamentals of bioethics, health promotion/disease prevention, biostatistics, and epidemiology. An optional summer research program between the first and second year provides an opportunity for students to explore various areas of basic science or clinical research.

### **Second Year**

The second-year curriculum is focused on human pathophysiology and pathology. Through lectures, small group discussions, laboratory exercises and independent study, students acquire broad, detailed knowledge of mechanisms of disease pathogenesis, clinopathological relationships and fundamental principles of therapy. The Practice of Medicine II continues students' introduction to the fundamentals of patient care, and emphasizes organizing and interpreting clinical information to form a problem list, differential diagnosis, and treatment plan. Students also learn how to accurately document and concisely present clinical information. Supervised clinical experiences and small group discussions further engender development of the professional attitudes and high ethical standards required for the third-year clinical clerkships.

### **Third Year**

The overall goal of the third year is implementation of fundamental interactive clinical skills necessary for the practice of medicine at the highest possible level of excellence. Students achieve this goal by participating in intensive, closely supervised training experiences in the core clinical clerkships involving inpatient and ambulatory settings and interactions with patients who present a spectrum of emergent, urgent, routine and chronic clinical problems. Through these experiences, students exhibit growth and maturation in their abilities to take medical histories, perform complete physical examinations, synthesize findings into a diagnosis, formulate treatment plans, and document and present information in a concise, logical and organized fashion. During the clinical clerkships, students learn to use the biomedical literature and other educational resources in the service of their patients and in self-directed learning. Students also use their personal experiences and rapidly expanding knowledge of human behavior and ethnic, cultural, socioeconomic and other social factors to develop their own personal standards of compassionate, respectful and ethical behavior in the practice of medicine.

### **Fourth Year**

The overall goals of the fourth year are to consolidate, enhance and refine the basic clinical skills developed during the clinical clerkships and to explore specialty areas within the field of medicine. This is accomplished by providing each student with optimal preparation for selecting and pursuing graduate medical education opportunities in his/her chosen field of medical practice and/or research. Students may select from a broad array of clinical rotations and research experiences and may arrange extramural experiences.

## **History**

The education of physicians at Washington University began in 1891. Under an ordinance enacted April 14, 1891, establishing a Medical Department of Washington University, the St. Louis Medical College (an independent medical college in St. Louis) was brought under the wing of the well-established University. The faculty of the college eagerly agreed to the union, stating "Most of the great medical schools of the world have always been integrant departments of universities, and the examples which America furnishes give added testimony to the fructifying influence of the contact of students and teachers of professional schools with the workers in universities." Eight years later, the

Missouri Medical College (another independent college in the city) also joined Washington University, and thus the two most famous medical colleges in the city were merged with the University.

In 1909, Abraham Flexner began a survey of 155 medical schools in the United States and Canada for the Carnegie Foundation for the Advancement of Teaching. The survey created a national sensation. Some schools collapsed, others pooled their resources, while still others reorganized. The Medical School of Washington University did not escape criticism. In the report Flexner made to Henry Smith Pritchett, Ph.D., president of the Carnegie Foundation for the Advancement of Teaching and former professor of astronomy at Washington University, he said that one of two courses must be adopted: "The department must be either abolished or reorganized."

Dr. Pritchett mailed the report to Robert S. Brookings, a St. Louis merchant who was president of the Board of Directors of Washington University. Brookings was shocked and immediately went to New York to see Flexner, demanding proof that the conditions were as bad as described. Both returned to St. Louis and the two men went through the School. In less than two hours, Brookings was convinced that drastic action was necessary if the School was to be one of the foremost institutions of medical education and research. The meeting in 1909 of Brookings and Flexner was of unsurpassed significance in the history of the Washington University School of Medicine, for it led to the complete reorganization of the School and the establishment of the present Medical Center. Abraham Flexner inspired the dream of a model medical school; Robert Brookings accepted the challenge, and with the energy and vision which characterized all his enterprises, made the dream a reality.

No time was lost in making changes. The Bulletin of the Medical School for July 1910 made the following statement: "The Corporation of the University, becoming convinced that in no other direction could greater service be rendered than through a great, modern medical school, determined to reorganize the School and to place it in the front rank of American medical institutions. It has called to the heads of a number of leading departments the ablest men it could secure."

When Robert A. Barnes died in 1892, he left a will which directed the trustees of his estate to use \$840,000 for the erection and equipment of a hospital "for sick and injured persons, without distinction of creed, under the auspices of the Methodist Episcopal Church, South." Investigation by the trustees into the cost of building a modern hospital convinced them that the sum was not large enough to build an efficient, fireproof building, and they therefore invested the trust. By 1912 the value had increased to \$2 million, a sum which permitted the building of a hospital and left an endowment greater than the original fund.

At the same time the trustees were studying hospital construction, Robert Brookings was studying medical schools. It was apparent to everyone concerned that the two projects, the building of a medical school and the construction of a modern hospital, were so interrelated that the purpose of each would be more successfully fulfilled by an affiliation. A medical school would provide a highly trained staff and would assure the most modern methods and superior laboratory facilities for the hospital. A teaching hospital would give patients superior care and, at the same time, provide the essential clinical experience consistent with modern medical teaching methods.

In the spring of 1912, construction was begun on the medical school and hospital buildings which today form the nucleus of the present center. The laboratories were moved from their old quarters in downtown St. Louis into the new buildings on Euclid Avenue and Kingshighway Boulevard during the summer of 1914, and late in the fall of the same year the activities of the Washington University Hospital were transferred to Barnes Hospital. Concomitantly, the St. Louis Children's Hospital, then located on Jefferson Avenue, became affiliated with the School of Medicine and moved to its new quarters in the Medical Center.

On April 28, 29 and 30, 1915, exercises were held to celebrate the completion of this group of buildings designed to promote the practice, the teaching and the progress of medicine. The dedication ceremonies marked what Dr. William H. Welch of The Johns Hopkins University called "one of the most significant events in the history of medical education in America." Robert S. Brookings, the one man most responsible for the reorganization, voiced the hope that "our efforts will contribute, in some measure, to raising the standard of medical education in the West, and that we will add, through research activities, our fair quota to the sum of the world's knowledge of medicine." These prophetic words have been realized.

In the ensuing years, the Medical Center has continued to grow, and now its facilities are among the best in the world. With the increase in size of the physical plant there has come a substantial increase in the number of the faculty; the expansion has been made without compromise to the standards that

marked the early development of the Medical Center. As a result, significant achievements in both research and clinical areas have been steadily recorded.

## **Faculty**

The Washington University School of Medicine has one of the finest faculties of any medical school in the nation. Recognized for their distinguished achievements in original research, 13 current faculty members have been elected to the National Academy of Sciences. Seventeen Nobel laureates have been associated with the School of Medicine.

During Fiscal Year 2003, 112 members of the faculty held individual or career development awards: 61 from the National Institutes of Health; one from the American College of Rheumatology; one from the American College of Surgeons; one from the American Diabetes Foundation; two from the American Digestive Health Foundation; one from the American Federation for Aging; one from the American Foundation for AIDS Research; nine from the American Heart Association; two from the American Lung Association; one from the American Society of Clinical Oncology; one from the American Society of Transplantation; one from the Arthritis Foundation; one from the Association of University Professors of Ophthalmology; seven from Burroughs Wellcome Fund; one from Children's Digestive Health & Nutrition Foundation; one from the Doris Duke Charitable Foundation; one from the John Douglas French Alzheimer's Foundation; one from the Infectious Disease Society of America; one from the Jansen Pharmaceutica; two from the W.M. Keck Foundation; two from the Esther A. and Joseph Klingenstein Fund, Inc.; one from the Leukemia & Lymphoma Society; three from the Leukemia Society of America, Inc.; one from the Muscular Dystrophy Association; three from the National Alliance for Research on Schizophrenia and Depression; one from the Orthopaedic Research and Education Foundation; one from the Pfizer Pharmaceuticals; two from Research to Prevent Blindness, Inc.; and one from the Whitaker Foundation.

The School of Medicine has 18 faculty members with Method to Extend Research in Time (MERIT) status, a special recognition given to only a few NIH grantees, which provides long-term, uninterrupted financial support to investigators who have demonstrated superior achievement during previous research projects.

In 2003-2004, the School employed 1,382 full-time, salaried faculty members in its 20 preclinical and clinical departments. The clinical departments are further strengthened by 1,143 part-time faculty members, a group of physicians who practice their medical specialties in St. Louis and are members of one or more of the staffs of the hospitals in the Washington University Medical Center.

## **Students**

The School of Medicine attracts a student body of exceptional quality. The 2003 Entering Class of 123 students was selected from a pool of 3,733 applicants. The School is a national institution with 45 states and 31 countries represented in the current enrollment.

In 2004, the School conferred the M.D. degree upon 95 individuals. In addition, five students received the M.A./M.D. degrees and 16 students graduated with the M.D. and the Ph.D. degrees. Graduating students who participated in the 2004 National Residency Matching Program matched in programs recognized for high quality and selectivity. In the Alphabetical List of Students area of the Register of Students section, the graduates are listed by name, hometown, undergraduate and graduate schools attended and year of degree, type of postgraduate residency program, name of hospital and the city in which it is located.

The student body of the School of Medicine numbers 579 medical students. Programs also are conducted for 412 students who are pursuing graduate degrees in health administration, occupational therapy, physical therapy, psychiatric epidemiology or genetic epidemiology. The Division of Biology and Biomedical Sciences has extensive graduate training programs for 573 students seeking the Doctor of Philosophy degree in areas of Biochemistry, Chemical Biology, Computational Biology, Developmental Biology, Evolutionary and Population Biology, Immunology, Molecular Biophysics, Molecular Cell Biology, Biochemistry, Molecular Genetics, Molecular Microbiology and Microbial Pathogenesis, Neurosciences and Plant Biology.



## Teaching Facilities

The 230-acre Washington University Medical Center, spread over portions of 18 city blocks, is located along the eastern edge of Forest Park in St. Louis. Along the western edge of the park is the 169-acre Hilltop Campus of the University. A regularly scheduled shuttle bus, operated for the benefit of students, faculty and staff, brings the two campuses within 10 minutes of each other.

The medical center was incorporated in 1962. It now consists of the Washington University School of Medicine, Barnes-Jewish Hospital, St. Louis Children's Hospital, Barnard Hospital and Central Institute for the Deaf, and is affiliated with BJC Health System. Two integral units of the Medical Center are the world-famous Mallinckrodt Institute of Radiology (MIR) and the Center for Computational Biology.

The medical center generates an annual financial impact of more than \$2.3 billion for the St. Louis area, according to an economic model maintained by the St. Louis Regional Commerce and Growth Association. With more than 20,000 employees, the combined medical center institutions are the second largest employer in the metropolitan area.

Unprecedented growth has occurred at the Medical Center over the past 10 years. At the School of Medicine alone during the past three years, more than \$205 million has been expended on renovation and new construction. Capital improvements have added 943,000 square feet of space to the medical school during this same period. In the most recent fiscal year, more than \$55 million of capital improvements were made at the School.

In the last 10 years, School of Medicine expansion has included the Eric P. Newman Education Center; the CSRB North Tower Research Addition; the East McDonnell Sciences Building; the Specialized Interim Research Facility; the Mallinckrodt Institute of Radiology Imaging Research Facility; the McDonnell Pediatric Research Building; the Southwest Tower; and the Center for Advanced Medicine.

The 45,160-gross-square-foot *Eric P. Newman Education Center* accommodates non-degree professional education for the Medical Center. The education center provides auditoriums, classrooms, meeting space and lecture halls to support and enhance a comprehensive education program. The 136,977-gross-square-foot, seven-story *East McDonnell Sciences Building* is a maximum-barrier research facility to accommodate higher brain function research and transgenic studies.

The 10-story *Clinical Sciences Research Building* (CSRB) North Tower Research Addition, 201,349 gross square feet, consolidates all medical school specialized research into one structure. The top three floors of the addition house wet lab research space. The addition of 45,000 gross square feet and renovation of 22,000 gross square feet in the *Mallinckrodt Institute of Radiology Imaging Research Facility, East Building*, provided space for the creation of an Imaging Center that houses four major MRI (Magnetic Resonance Imaging) units. The 494,500-gross-square-foot, 1,500-car parking garage, built on the northeast corner of Taylor and Clayton avenues, is a reinforced, seven-level structure that provides much-needed additional parking. Moreover, the new 230,000-square-foot *McDonnell Pediatric Research Building* adds new, state-of-the-art research facilities, 4.5 floors for the Department of Pediatrics, three floors for the Department of Molecular Microbiology, and one half floor for the Department of Medicine, on the corner of Euclid Avenue and Children's Place. This new building includes a *Barnes & Noble* bookstore with a coffee shop on the ground floor level.

The *Center for Advanced Medicine*, located at the corner of Euclid and Forest Park avenues, is a shared facility between the School and BJC. This building brings all of the Medical Center's clinics together under one roof. The School of Medicine occupies 243,400 square feet in the Center for Advanced Medicine and 75,000 square feet on three floors in the Southwest Tower. Located in the heart of the Center for Advanced Medicine is the 66,150 square foot *Alvin J. Siteman Cancer Center*. The Siteman Cancer Center is the only designated cancer center by the National Cancer Institute in the region.

In addition, major renovations to existing buildings continue, with emphasis on research facilities. Within the last two years, renovations totaling \$95 million have been completed. The Department of Biochemistry has undertaken a significant renovation of the first floor of the South Building for new laboratories and offices. The Department of Genetics expanded in 2002 through renovations on the seventh and eighth floors of McDonnell Sciences Research Building and together with the Department of Pharmacology recently started up the Center for Genomics and Human Genetics with wet lab renovation of 12,000 square feet on the 5th floor of 4444 Forest Park. The Department of Biochemistry added another Nuclear Magnetic Resonance (NMR) Spectrometer in a small addition to Cancer Research Building. The Departments of Cell Biology and Internal Medicine jointly renovated research labs on the 5th floor of McDonnell Medical Sciences building. Ongoing improvements to the campus infrastructure are being made through the Public Realm Project, which is focused on

landscape and streetscape enhancements.

The School of Medicine is divided into two segments. Clinical departments are on the west side of the Medical Center, adjacent to hospital and patient areas. Preclinical departments are to the east. Research and instructional endeavors occupy the greater portion of the facilities, with more than 1.8 million gross square feet devoted to these activities. In the aggregate, the medical school occupies more than 5 million gross square feet of space.

The focal point of the preclinical teaching activities is the *McDonnell Medical Sciences Building*, the center of activity for entering medical students. The McDonnell Building, with 300,000 square feet of first-class research laboratories and classroom space, was made possible by James Smith McDonnell III, a generous benefactor of Washington University. Rising nine floors above ground, it contains administrative offices and two lecture halls on the first floor. Multidisciplinary teaching laboratories for first- and second-year students, as well as offices and research laboratories for the seven basic science departments, are located on the upper floors. Modern centralized animal quarters are housed in the basement. In addition, two floors (15,467 gross square feet) of *Olin Residence Hall* have been converted into student carrels, classrooms and conference rooms. New teaching facilities are under way with the construction of the *Farrell Learning and Teaching Center*, with occupancy in August, 2005.

*The North and South Buildings*, in which the work of several Nobel laureates has centered, have been renovated extensively. Along with the Cancer Research Building, they continue to provide space for laboratories, offices and some departmental facilities. The East Building houses an MRI facility, computer installation and other components of the Mallinckrodt Institute of Radiology. The East Building also houses several administrative office suites.

A network of pedestrian bridges provides the ability to move freely among the major facilities, enhancing the interaction of all Medical Center institutions and benefiting research and patient care.

Other facilities owned or operated by Washington University include:

*Biotechnology Center.* This five-story facility was recently renovated into laboratories for the departments of Psychiatry, Internal Medicine and Pathology.

*McMillan Hospital.* McMillan houses offices and research laboratories for the Departments of Neurological Surgery, Neurology, Ophthalmology and Visual Sciences, and Otolaryngology.

*The Edward Mallinckrodt Institute of Radiology (MIR).* Mallinckrodt Institute is internationally recognized for excellence in teaching, research and clinical services. Housed in its own 13-story building, MIR also has satellite facilities in Barnes-Jewish, St. Louis Children's and Wohl hospitals; the Clinical Sciences Research and East buildings; the Scott Avenue Imaging Center; the Center for Advanced Medicine; and the Knight Emergency and Trauma Center.

*Renard Hospital.* With consolidation of psychiatric patient care services in the West Pavilion, this eight-story structure provides additional office and laboratory space for the Department of Psychiatry.

*St. Louis Maternity Hospital.* Maternity Hospital houses offices for the Departments of Obstetrics and Gynecology, and Ophthalmology and Visual Sciences. A Perinatal Center and laboratories for research in the physiology of reproduction and Psychiatry clinical research are located in this building.

*West Building.* The West Building contains offices and research laboratories for the Departments of Pathology and Internal Medicine.

*David P. Wohl, Jr. Memorial Hospital.* Wohl Hospital, opened in 1953, provides offices and laboratories for the Departments of Medicine and Surgery.

*David P. Wohl, Jr. Memorial-Washington University Outpatient Clinics.* The remaining clinics are administered by Barnes-Jewish Hospital. The lower five floors contain clinical space and space for translational research. The first floor is home for the Chromalloy Kidney Dialysis Center. The upper five floors are devoted to research facilities for several departments of the School of Medicine.

*4444 Forest Park.* This 294,302-gross-square-foot building houses administrative offices of various medical school departments, the Program in Physical Therapy, the Program in Occupational Therapy and a major research facility for the Department of Genetics and the Genome Sequencing Center, including the new Center for Genomics and Human Genetics.

*Bernard Becker Medical Library.* Founded in 1911, the Washington University Medical School library is one of the oldest and most comprehensive medical libraries west of the Mississippi. The Bernard Becker Medical Library serves as an information and technology services hub for the Medical Center and extends its services and resources to the global health science community.

The facility, completed in 1989, integrates biomedical information resources and information technology. The eight-level, 114,000-square-foot structure has a capacity for more than 300,000 volumes. The biomedical resource collection includes more than 200,000 volumes, some 2,000 audiovisual items and over 2,000 current journal subscriptions.

Information Services, as part of Communication and Outreach division, answers a wide range of questions covering biomedical and general information. Staff may be contacted by telephone, (314) 362-7085, by electronic mail, [reference@medicine.wustl.edu](mailto:reference@medicine.wustl.edu), or at the Information Services desk on Level 1 of the library. Information Services offers individual and group training in database searching. Audience-specific classes can be designed for Medline, Evidence Based Medicine or information management software. Training sessions can be held in the library or off site.

E-Catalog provides complete and current information about the library's collections. It includes access to over 1,400 electronic full-text journals, 50 online books, and numerous selected web sites. Ovid Online is the library's premier tool for searching and retrieving biomedical journal literature. Other valuable electronic resources include the Web of Science, Journal Citation Reports and the Cochrane Library. Remote access for these products is available for office or home use. Materials not owned by Becker Medical Library can be obtained through interlibrary loan and document delivery service.

Instructional Technologies and Library Systems (ITLS) offers computer programs, a network of advanced personal computer workstations, and a large computer education classroom. The staff supports student computing. ITLS has been instrumental in supporting the use of high-capacity networks and digital imaging technology in the medical curriculum. ITLS also supports peripheral computer laboratories at other education sites within the Medical Center.

The Becker Library's technology divisions provide the capability for electronic mail, Internet access and a wide array of specialized software services for all faculty, students and Medical Center collaborators. The facility consists of a broad complement of high-performance servers to accommodate the heterogeneous needs of the Medical Center. A help desk service is available to all faculty and staff during normal working hours. These divisions also ensure that network-based information resources available from the library are disseminated effectively to all Medical Center collaborators.

Access and Collection Services manages the print collection, archives and rare books. Some 2000 volumes from the now closed Central Institute for the Deaf library were added to Becker's book and journal collection in 2003. The library's Archives and Rare Books unit includes almost 22,000 volumes and outstanding collections such as the Bernard Becker Collection in Ophthalmology, the CID-Max Goldstein Collection in Speech and Hearing, the H. Richard Taylor Collection in Neurology, and the Paracelsus Collection of the St. Louis Medical Society. The archives of the Medical Center contain the records and private papers of the School, memorabilia and oral histories of individuals who have made important contributions to American medicine. Among the manuscript collections are papers of William Beaumont, Joseph Erlanger, E.V. Cowdry, Evarts Graham and Carl Cori.

The Bernard Becker Medical Library takes pride in providing the latest biomedical information and technology services to the Medical Center. For detailed information about the library's programs and services visit: <http://becker.wustl.edu/>.

Library hours and telephone numbers are:

Monday-Thursday: 7:30 a.m. - midnight

Friday: 7:30 a.m. - 10 p.m.

Saturday: 8:30 a.m. - 6 p.m.

Sunday: 12 p.m. - midnight

Expanded study hours during exam periods and holiday hours are posted as needed.

Circulation Services: (314) 362-7080

Information Services: (314) 362-7085

Interlibrary Loan:(314) 747-0028

Instructional Technologies and Library Systems:(314) 362-2793

*Barnes-Jewish Hospital*, a 1,371-bed teaching and research facility, is the largest hospital in Missouri, with 566,750 inpatient admissions, outpatient, and emergency department visits from patients around the world. It provides clinical experience for medical students for all clinical departments except Pediatrics. The medical staff is composed exclusively of members of the faculty of the School of Medicine.

Rated by *U.S. News & World Report* as one of the top 10 hospitals in the country, Barnes-Jewish Hospital has a premier reputation in patient care, medical education, research and community service. Its areas of expertise include cancer, cardiology, cardiothoracic surgery, endocrinology, gastroenterology, geriatrics, gynecology, infectious diseases, nephrology, neurology, neurosurgery, ophthalmology, orthopaedic surgery, otolaryngology, pulmonary disease, rheumatology, transplantation and urology.

*St. Louis Children's Hospital*. Since 1879, St. Louis Children's Hospital has been at the forefront of pediatric medicine, with physicians, nurses and staff who dedicate their lives to the care of children. The hospital provides a full range of health services to children and their families throughout its 300-mile service area, as well as nationally and internationally. Its spectrum of pediatric specialty services includes newborn medicine, cardiology, neurosurgery and the world's largest pediatric lung transplant program. In 2003, Children's Hospital was rated #6 on *Child* magazine's Top 10 list of the best children's hospitals in America.

St. Louis Children's Hospital also provides an array of community outreach services, including pediatric mobile health vans, injury prevention programs, educational classes on parenting and child development, as well as patient and parent support groups. The hospital also operates the 454-KIDS Answer Line, a free child health information service and physician referral line staffed by pediatric registered nurses and referral specialists.

Barnes-Jewish and St. Louis Children's hospitals are members of BJC HealthCare, a regional health care system that provides community-based and academic health care services at more than 100 inpatient and ambulatory care sites throughout Missouri and southern Illinois. BJC, in partnership with its physicians, provides a full continuum of health care services, including wellness and health promotion; primary, acute and ambulatory care; skilled nursing; long-term care; home health care; and hospice care.

Through a collaboration among *Barnard Free Skin and Cancer Hospital*, *Barnes-Jewish Hospital* and *Washington University*, medically indigent patients with cancer or diseases of the skin receive free care from Washington University physicians at the *Alvin J. Siteman Cancer Center* and Barnes-Jewish Hospital. Barnard Free Skin and Cancer Hospital also houses the Washington University General Clinical Research Center (GCRC), a support center for Washington University clinical investigators.

*Central Institute for the Deaf*. Founded in 1914 as a place where teachers, hearing and speech professionals, and parents work together to help children with hearing loss, Central Institute for the Deaf (CID) is an internationally recognized center for oral deaf education, preparing its students to participate and succeed in mainstream educational settings. CID teachers use the auditory-oral method, helping deaf children learn to speak, listen and read with proficiency without the use of sign language. CID's acoustically enhanced "quiet school" features the Joanne Parrish Knight Family Center, serving children and their families from birth to 3. CID preschool-kindergarten and primary-middle school programs serve students ages 3 to 12. CID school children have come from 48 U.S. states and 24 other countries.

CID outreach services include mainstream transitional assistance for students, continuing education workshops for professionals, and evaluations and curricula used to help hearing-impaired children in all U.S. states and at least 33 countries throughout the world.

CID is financially independent from, but closely affiliated with, CID at Washington University School of Medicine, which continues to operate CID-developed clinic, research and academic programs that benefit children and adults with hearing loss. The University acquired these programs in September of 2003 along with state-of-the-art facilities at the CID campus, 4560 Clayton Avenue, on the south side of the School of Medicine. CID continues to provide faculty and practicum sites for the University's graduate degree programs in deaf education and audiology. CID teachers and pediatric audiologists continue to work closely with its speech and hearing scientists in studies involving children with hearing loss.

*The Alvin J. Siteman Cancer Center* at Washington University School of Medicine and Barnes-Jewish Hospital is world-renowned for its basic science, translational research and patient care. The Siteman Cancer Center holds more than \$120 million in extramural funding for cancer research and is organized into eight research programs (Cancer Genetics, Cancer and Developmental Biology, Tumor Immunology, Hematopoietic Development and Malignancy, Cellular Proliferation, Oncologic Imaging, Prevention and Control, Clinical and Translational and Clinical Research). The Siteman Cancer Center also provides 14 shared resource facilities to its more than 240 research members. Shared resource facilities include: Bioinformatics Core, Biostatistics Core, Clinical Trials Core, Embryonic Stem Cell Core, Hereditary Cancer Core, High-Speed Cell Sorter Core, Molecular Core Laboratory, Multiplexed Gene Analysis Core, Pharmacology Core, Proteomics Core, Small Animal Cancer Imaging Core, Health Behavior and Outreach Core, Good Manufacturing Practice Facility and Tissue Procurement Core.

Other hospitals. The following hospitals also are associated with the School of Medicine, and various members of their staffs hold University appointments:

- Christian Hospitals Northeast and Northwest: 463 beds
- Metropolitan St. Louis Psychiatric Center: 125 beds
- Missouri Baptist Medical Center: 358 beds
- Veterans Administration Medical Center: 116 beds
- Shriners Hospital for Children: 80 beds

## **Research Activities**

Grants and contracts totaling more than \$419 million supported faculty research efforts at the School of Medicine in fiscal year 2003. Substantial additional support was provided directly to faculty investigators by the Howard Hughes Medical Institute and by the Barnes-Jewish Hospital Foundation. Gifts and grants from private sources, including alumni, individuals, foundations, corporations and other organizations totaled \$53.2 million from 7,159 entities.

The School of Medicine received \$368.4 million from the National Institutes of Health in grants, making it the second-largest recipient of NIH dollars among the 125 U.S. medical schools in fiscal year 2003. That money came in 775 separate awards, 691 of which were designated as research grants, with the remainder primarily funding training and education activities. NIH research grants supported the investigations of at least 754 full-time faculty members.

The Johns Hopkins University: \$414,225,650  
Washington University: \$368,355,293  
University of Pennsylvania: \$359,944,311  
University of California, San Francisco: \$350,786,145

The many medical firsts at the School of Medicine include:

- Part of the international team that announced the first working draft of the human genome.
- Generated cells that, when injected into the spinal cords of rats, reinsulate nerve axons and improve mobility.
- Developed a genetic test that detects whether an individual will develop a form of thyroid cancer and would benefit from thyroid removal—the first surgical prevention of cancer based on genetic test results.
- Developed a rating scale used worldwide to diagnose Alzheimer's disease.
- Created the first PET scanner, a device that images the brain at work.
- Developed a new strategy for creating vaccines and antibiotics against bacteria such as those that infect the bladder.
- Helped pioneer the use of insulin to treat diabetes.
- Developed a blood test for early diagnosis of prostate cancer.
- Proposed the now-common practice of taking aspirin to help prevent heart attacks.
- Developed a surgery to remove damaged portions of emphysema patients' lungs, dramatically improving function.
- Pioneered research into excitotoxicity and brain injury.
- Developed a cure for hepatitis B in cases diagnosed early.
- Created a surgical cure for atrial fibrillation.
- Performed the world's first nerve transplant using nerve tissue from a cadaver donor.
- Developed a blood test that quickly and safely identifies whether a heart attack patient will require invasive treatment.
- Performed innovative larynx restoration surgery for the first time in the United States.
- Helped pioneer cochlear implant technology.
- Demonstrated that bacteria, not stress, cause ulcers.

- Performed the first surgical removal of a cancerous lung.
- Pioneered the use of surgery and medication to lower eye pressure in glaucoma patients to prevent further vision loss.

Ongoing research includes:

- Identifying a link between AIDS drugs and diseases such as osteoporosis and diabetes.
- Leading an international research team in the identification and isolation of a genetic risk factor for Alzheimer's disease.
- Imaging language areas in adult and pediatric brains during recovery from stroke to observe natural rehabilitation patterns.
- Investigating and developing weight loss approaches, including a comparison of low-fat and low-carbohydrate diets.
- Studying unsafe sleep practices and their relation to the risk of infant death.
- Developing drug therapies for histoplasmosis and malaria.
- Identifying clinical signs of early Alzheimer's disease and investigating the molecular cause of the disease.
- Developing and using new imaging tools to study how nervous system cells form connections.
- Developing a new model of asthma that addresses the role of antiviral response.
- Determining the effect of antidepressant medications on the brain.
- Identifying the role of ethnicity in response to drugs.
- Imaging people with schizophrenia and Alzheimer's disease to identify anatomical markers of the disease.
- Developing and implementing activity-based rehabilitation in old and new spinal cord injury and stroke patients; investigating the potential of new therapies for regenerating nerve cells.
- Leading efforts to identify the underlying cause of recurrent urinary tract infections.

## **BioMed 21**

To meet the challenge posed by the current revolution in the biomedical sciences, the School of Medicine has devised a bold new strategy—BioMed 21—to support translational research. Three new research units (Center for Genomics and Human Genetics, Division of Clinical Sciences, Center for Biological Imaging) accessible to faculty on both the Hilltop and medical campuses will catalyze and support emerging forms of bioresearch and rapidly convert the knowledge of the genetic blueprint into effective, individualized treatments designed to improve human health.

## **Curriculum**

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The curriculum is an evolving product of prolonged and continuing study, by both faculty and students, of the present and probable future course of medical science and medical practice, and of the ways in which medical education can be kept abreast of this course. Our students enter medical school with diverse backgrounds and interests and upon graduation undertake a wide variety of careers. The curriculum provides the basic knowledge and skills essential for their further professional development. Modern medical education can no longer hope to be comprehensive; it must be selective. Yet students must develop facility in the understanding and use of several related technical languages: those of anatomy, chemistry, physiology and clinical medicine. They must share responsibility for the care of the patient. They also must learn how these areas of endeavor are interrelated, how the organization and needs of society influence the methods of providing medical care, and how new knowledge is acquired and old knowledge re-evaluated.

The curriculum includes a core experience based upon a sequence of courses that introduces students to the many domains and disciplines of medicine. The principles, the methods of investigation, the problems and the opportunities in each of the major disciplines of medical science and medical practice are presented in such a way as to help students select the career best suited to their abilities and goals.

In the final year of the medical school curriculum, the required elective program helps students to decide where major interests lie. It also enables them to benefit from the wide range of specialized knowledge and skills found in the faculty and lays the foundation for lifelong learning and application of principles. The elective program permits students to select, according to their desires, the areas they wish to explore or to study in depth.

## ***Table of Courses/Coursemasters 2004-2005***

### ***First Year***

First-year courses are taught during the 38-week academic year.

#### **Course No./Course Title**

M75 503	Cell and Organ Systems Biology Paul C. Bridgman, Ph.D., 362-3449 (Histology) Robert S. Wilkinson, Ph.D., 362-2300 (Physiology)
M05 501A	Human Anatomy and Development Glenn C. Conroy, Ph.D., 362-3397
M30 523	Immunology Andrey S. Shaw, M.D., 362-4614
M30 511	Medical Genetics Alison J. Whelan, M.D., 362-7800
M30 526	Microbes and Pathogenesis Henry V. Huang, Ph.D., 362-2755
M15 502	Molecular Foundations of Medicine Linda J. Pike, Ph.D., 362-9502
M35 554	Neural Sciences David C. Van Essen, Ph.D., 362-7043 Timothy E. Holy, Ph.D., 362-0086 W. Thomas Thach Jr., M.D., 362-3538
M25 507	The Practice of Medicine I Robert J. Rothbaum, M.D., 454-6173 <ul style="list-style-type: none"> <li>• Clinical Skills Katherine E. Henderson, M.D., 362-8065</li> <li>• Ethics and Health Policy Rebecca Dresser, J.D., 454-7116</li> <li>• Health Promotion/Disease Prevention Bradley A. Evanoff, M.D., M.P.H., 286-2546</li> <li>• Interpreting Illness Stephen S. Lefrak, M.D., 454-7116</li> <li>• Patient-Physician Communication Kellie L. Flood, M.D., 286-2713</li> <li>• Scientific Method of Clinical Medicine and Research Jay F. Piccirillo, M.D., 362-7394</li> </ul>

#### **Selectives**

M04	<ul style="list-style-type: none"> <li>• General Selectives Koong-Nah Chung, Ph.D., 362-4395</li> </ul>
M04	<ul style="list-style-type: none"> <li>• Medical Humanities Stephen S. Lefrak, M.D., 454-7116</li> </ul>

A selective is 10 clock hours in duration. Examples of selective offerings from last year include:

M04 501	Anatomy Through the Eyes of the Radiologist
M04 514	Cardiovascular Biophysics
M04 519	Case Problems in Biochemistry and Cell Biology
M04 526	New Diseases, New Pathogens
M04 533	Tropical Medicine
M04 534A	Progression of Kidney Disease
M04 536	Autonomic Mechanisms in Diseased States
M04 537	Cardiovascular Control Mechanism
M04 552	Genetics and Molecular Biology of Ion Channels
M04 561	Brain Blood Vessels
M04 5667	Microcirculation
M04 582	Alzheimer's Disease
M04 584	Medical Aspects of Domestic Violence
M04 587A	Physician as Health Protector and Patient Advocate
M04 589	Topics in Viral Pathogenesis
M04 596	Ion Channels and Disease

## ***Second Year***

Second-year courses are taught during the 36-week academic year.

### **Course No/Course Title**

M25 611B	Cardiovascular Disease Dana R. Abendschein, Ph.D., 362-8925
M25 614	Dermatology Lynn A. Cornelius, M.D., 362-8187 Jeffrey E. Petersen, M.D., 996-8810
M35 632	Diseases of the Nervous System Allyson Zazulia, M.D., 362-6378
M55 660B	Clinical Topics in Otolaryngology Joel A. Goebel, M.D., 747-0553 James M. Hartman, M.D., 367-7346
M25 615A	Endocrinology and Metabolism William E. Clutter, M.D., 362-8094
M25 620A	Gastrointestinal and Liver Diseases/Nutrition Deborah C. Rubin, M.D., 362-8940
M25 625A	Hematology and Oncology Scot G. Hickman, M.D., 289-6308
M25 605A	Infectious Diseases Nigar Kirmani, M.D., 454-8214
M45 635B	Obstetrics/Gynecology Andrea P. Stephens, M.D., 362-1016, 362-3126
M60 665	Pathology Erika C. Crouch, Ph.D., M.D., 454-8462
M65 640	Pediatrics Leonard B. Bacharier, M.D., 454-6299
M25 607	The Practice of Medicine II Megan Wren, M.D., 362-8050



- Clinical Skills  
Katherine E. Henderson, M.D., 362-8065
- Ethics and Health Policy  
Rebecca S. Dresser, J.D., 454-7116
- Health Promotion/Disease Prevention  
Bradley A. Evanoff, M.D., M.P.H., 286-2546
- Interpreting Illness  
Stephen S. Lefrak, M.D., 454-7116
- Medicine Patient Sessions  
Katherine E. Henderson, M.D., 362-8065
- Neurology Patient Sessions  
Allyson Zazulia, M.D., 362-6378
- Ophthalmology  
Morton E. Smith, M.D., 362-5722
- Patient-Physician Communication  
Kellie L. Flood, M.D., 286-2713
- Radiology  
Sanjeev Bhalla, M.D., 362-2927  
Harvey S. Glaser, M.D., 362-2927
- Scientific Method of Clinical Medicine and Research  
Jay F. Piccirillo, M.D., 362-7394

M70 670A	Principles of Pharmacology Douglas F. Covey, Ph.D., 362-1726
M85 676A	Diseases of the Nervous System: Psychiatry Laura J. Bierut, M.D., 362-3492 Melissa A. Swallow, M.D., 362-2440
M25 612B	Pulmonary Diseases Michael B. Lippmann, M.D., 289-6306
M25 613B	Renal and Genitourinary Diseases Stanley Misler, Ph.D., M.D., 454-7966 David Windus, M.D., 362-7211
M25 606A	Rheumatology Leslie E. Kahl, M.D., 454-7279

## ***Third Year***

Clinical Clerkship (Third) Year is a 48-week academic year.

### **Course No./Course Title**

Selective Clerkships:  
(choice of one block)

M25 714	• Ambulatory: Emergency Medicine Clerkship (4 weeks) Mark Levine, M.D., 362-6743 Sandy Sineff, M.D., 362-7959
M26 713	• Ambulatory: Family Medicine Clerkship (4 weeks) Walton Sumner II, M.D., 454-8164
M85 771	• Ambulatory Clerkship: Psychiatry for Generalists (4 weeks) Kevin J. Black, M.D., 362-2469
M25 740	• Dermatology Clerkship (4 weeks) Lynn Cornelius, M.D., 454-8622
M25 750	• Geriatric Clerkship (4 weeks)

David B. Carr, M.D., 286-2706

- M25 730      • Physical Medicine and Rehabilitation Clerkship (4 weeks)  
Oksana Volshteyn, M.D., 454-7757
- M90 740      • Radiation Oncology Clerkship (4 weeks)  
Joseph R. Simpson, M.D., Ph.D., 362-8567

### **Required Clerkships:**

- M95 790      Integrated Surgical Disciplines Clerkship (12 Weeks)  
Eric Choi, M.D., 362-8029
- M25 710      Medicine Clerkship (12 Weeks)  
Thomas M. De Fer, M.D., 362-8050
- M35 720      Neurology Clerkship (4 weeks)  
Robert Naismith, M.D., 362-3293
- M85 770      Psychiatry Clerkship (4 weeks)  
Kevin J. Black, M.D., 747-2013

### **Women's and Children's Health Clerkships:**

- M65 760      • Pediatrics Clerkship (12 Weeks)  
Angela M. Sharkey, M.D., 454-6299  
Kathleen A. McGann, M.D., 454-6299
- M45 730      • Obstetrics/Gynecology Clerkship (12 Weeks)  
Andrea P. Stephens, M.D., 362-1016, 362-3126

## ***Fourth Year***

Elective (Fourth) Year is a 44-week academic year.

To qualify for the Doctor of Medicine degree at Washington University School of Medicine, fourth-year students are required to participate in a minimum of 36 weeks of electives (full-time clinical or research courses). Two-thirds of the minimum required time for the Elective Year must be taken exclusively in residence in the Washington University School of Medicine elective course program. A complete listing of fourth-year elective offerings at Washington University School of Medicine is available through the Office of the Associate Dean for Medical Student Education. Students may participate in clinical electives of four weeks duration. If a student takes a research elective, that elective must be of at least six weeks' duration.

A maximum of 12 weeks' credit is allowed for full-time elective coursework taken at other academic institutions. These may be clinical or research electives. Students desiring credit for work to be done at other institutions must petition the Associate Dean for Medical Student Education. Absolutely no credit will be granted for electives undertaken prior to approval from the appropriate administrative committees.

Credit may be given for elective work done at any point in the standard four-year Doctor of Medicine degree program so long as participation conforms to current elective guidelines, and a) the student is a duly registered, full-time student for a minimum of three years and nine months, including scheduled vacation time, and tuition is paid for four complete academic years; or b) if transferring into the third-year class, the student is a duly registered, full-time student for a minimum of 22 months and tuition is paid for two complete academic years.

Students are encouraged to take lecture-seminar elective courses, but such offerings are optional. Clock hours for the year total 1,386 (36 weeks). Remuneration for work done while participating in electives for credit is prohibited.

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## ***Lectureships and Visiting Professorships***

Several established lectureships enable the School to bring to the Medical Center each year distinguished guests who contribute significantly to the richness of student life.

Ben T. Abelson Memorial Lectureship in Pediatric Hematology-Oncology. Established by Mrs. Ben T. (Ann) Abelson, the first lecture was held on January 8, 1988.

Harry Alexander Visiting Professorship. Established in 1964 by former house staff and friends of Dr. Harry Alexander to provide an annual visiting professor in the Department of Medicine.

Alpha Omega Alpha Lectureship. Given each year by a faculty member of the students' selection.

Daniel R. Biello Memorial Lectureship. Established in 1986 by friends, students and colleagues of Dr. Daniel R. Biello to provide an annual lectureship devoted to advances in radiology and nuclear medicine.

George H. Bishop Lectureship. Supported by funds made available by friends interested in the advancement of neurology.

Daniel Bisno, M.D., Memorial Lecture on Ethics in Ophthalmology. Established in 2001 by David C. Bisno, M.D., in memory of his father.

Estelle Brodman Lectureship Fund. Established in 1981 by friends and colleagues of Dr. Brodman in honor of her distinguished contributions to the School of Medicine.

The James Barrett Brown Visiting Professorship in Plastic and Reconstructive Surgery. Created in 1969 by patients, friends, colleagues and former students to honor Dr. Brown.

Thomas H. Burford Lectureship in Thoracic Surgery. Founded in 1971 by friends of Dr. Burford.

H. Marvin Camel Lectureship. Established in 1999 by family, friends and colleagues to honor Dr. H. Marvin Camel's retirement.

Glover H. Copher Lectureship in Cancer. Founded in 1971 with endowment provided by Dr. Copher and friends.

The Carl F. and Gerty T. Cori Visiting Professorship. Established in 1985 in honor of Nobel Laureates Carl and Gerty Cori by the Edward Mallinckrodt, Jr. Foundation, colleagues, faculty and former students.

Philip R. Dodge Lectureship. Established in 1987 by friends and colleagues to provide an annual lectureship in the Department of Pediatrics.

Joseph Erlanger Lectureship. Established in 1989 by the Department of Cell Biology and Physiology to honor Dr. Erlanger.

I. Jerome Flance Visiting Professorship. Established in 1977 by former students and friends of Dr. Flance to provide annually a visiting professor in the Division of Pulmonary Diseases.

Julia Hudson Freund Lecture in Oncology. Established in 1982 by S.E. Freund in memory of his wife to provide a visiting lectureship in clinical oncology in the Division of Oncology. This was endowed in 2002 by the Harry and Flora D. Freund Memorial Foundation.

Harvey A. and Dorismae Hacker Friedman Lecture on Aging.

Edwin F. Gildea, Jr. Lectureship in Psychiatry. Established in 1978 by friends, colleagues and former students of Dr. Gildea.

Joseph J. Gitt Visiting Professorship in Clinical Neurology. Established in 1971 by his family and friends to honor Dr. Gitt.

Graham Colloquium. A gift from Mr. and Mrs. Evarts Graham, Jr., in 1963 to encourage opportunities for students to expand their views on social, philosophical, artistic and political topics.

The Evarts A. Graham Lecture. Established in 1985 by the Washington University Alumni of the Phi Beta Pi medical fraternity to honor the memory of Dr. Evarts A. Graham.

Samuel B. Guze Lectureship. Established in 1990 by friends and colleagues to honor Dr. Guze.

Carl Gayler Harford Lectureship. Established in 1977 by the family of one of Dr. Harford's patients in gratitude for his contributions to teaching clinical medicine and virology.

Alexis F. Hartmann, Sr. Lectureship. Established in 1960 by friends interested in pediatrics to provide an annual lecture in Dr. Hartmann's honor.

Alex H. Kaplan Visiting Professorship/Lectureship. Established in 1986 by Dr. and Mrs. Alex H. Kaplan to support a visiting psychoanalyst.

Michael and Irene Karl Lectureship in General Internal Medicine. Created in 1983 by Mr. and Mrs. Meyer Kopolow to provide an annual lectureship in honor of Drs. Michael and Irene Karl.

The Jack and Barry Kayes Lectureship in Ophthalmology and Visual Sciences. Established in 2001 by Dr. Jack and Mrs. Barry Kayes to endow a lectureship in the Department of Ophthalmology and Visual Sciences.

Charles Kilo, M.D. Lectureship in Internal Medicine. Established in 1998 by Mrs. Ola H. Blodgett to pay tribute to the expert and compassionate care provided by Dr. Charles Kilo.

David M. Kipnis Lectureship in Molecular Biology and Pharmacology. Established in 1998 to provide an annual lecture in honor of Dr. Kipnis.

Robert S. Klayman Memorial Lecture. Established in 1997 by Mrs. Robert S. Klayman, in memory of her husband, to support an annual lecture on Parkinson's Disease Research.

Kroc Visiting Lectureship Program. Established in 1985 by The Kroc Foundation in honor of Ray A. and Robert L. Kroc.

Paul E. Lacy Lectureship in Pathology. Established in 1987 by The Kilo Diabetes and Vascular Research Foundation in honor of Dr. Lacy's many contributions to pathology and diabetes research, and to recognize his collaboration over the years with the co-founders of The Kilo Foundation.

William M. Landau Lectureship. This lectureship was established in 1995 by friends, family and colleagues of Dr. Landau.

Marvin and Barbara Levin Visiting Lectureship. Established in 1997 by Dr. Marvin & Mrs. Barbara Levin to support an endocrinology lectureship in Medicine.

Irwin Levy Memorial Fund. Supports the Dr. Irwin Levy Visiting Lectureship in Neurology, which was established in 1978 by Mr. and Mrs. Meyer Kopolow.

Oliver H. Lowry Lectureship. Established in 1978 by friends, colleagues and former students of Dr. Lowry.

H. Relton McCarroll, Sr. Visiting Professorship in Orthopaedic Surgery. Created in 1972 by patients, friends, colleagues and former students in honor of Dr. McCarroll.

Edward Massie Lectureship in Cardiovascular Disease. Established in 1981 by Edward J. Simon, M.D., Bernard Shanker and other grateful colleagues and patients.

G. Leland Melson II Lectureship. Established in 1993 in memory of Dr. Melson by his friends and colleagues.

J. Neal and Lois Middelkamp Lectureship. Established in 2001 by Dr. J. Neal and Lois Middelkamp to support a pediatric lectureship in infectious diseases and advances in pediatric education for medical students, residents and pediatricians, all life-long interests of Dr. Middelkamp.

The Dr. and Mrs. William B. Mill, Jr. Lectureship. Established in 2001 in the Department of Radiation Oncology by Dr. and Mrs. William B. Mill, Jr. This was given in recognition of the career

accomplishments of Carlos A. Perez, M.D., and the impact he had on the professional development of Dr. Mill.

Carl V. Moore Lectureship. Established in 1973 by friends and patients of Dr. Carl V. Moore.

Carl A. Moyer Visiting Professorship of Surgery. Established in 1978 by The Harry Freund Memorial Foundation to support an annual lecture in honor of Dr. Moyer's contribution to surgery.

National Kidney Foundation — Saulo Klahr, M.D. Lectureship. Established in 1991 by the Kidney Foundation to honor Dr. Klahr, past president of the National Kidney Foundation and the John E. and Adaline Simon Professor and Vice Chair of the Department of Medicine at Washington University.

Joseph H. Ogura Lectureship. Established in 1977 by friends and colleagues of Dr. Ogura as a tribute to his numerous scientific accomplishments and contributions to the School of Medicine and graduate medical education, and his commitment to patient care.

Carlos A. Perez Endowed Lectureship in Oncology. Established in 2002 in the Department of Radiation Oncology by Dr. Perez's friends, colleagues, and current and former trainees in grateful recognition for his inspiration, guidance and leadership.

Dr. Roy H. Petrie Lectureship. Established in 2000 with gifts from various donors in memory of Roy H. Petrie, M.D.

Rose and Samuel Pollock Surgical Lectureship. Established in 1976 by Dr. Joseph H. Pollock in memory of his parents.

The Probststein Oncology Lectureship. Established in 1985 by Mr. and Mrs. Norman K. Probststein in appreciation of professional services provided by William Fair, M.D., former head of the urology division of the Department of Surgery, and Carlos Perez, M.D., professor emeritus of radiology and head of radiation oncology at the Medical Center's Mallinckrodt Institute of Radiology.

James A. Purdy Endowed Lectureship. Established by Elekta Oncology Systems, Ltd. in 2002 to honor Dr. James Purdy for his contributions to the field of Radiation Oncology.

Eli Robins Lectureship in Psychiatry. Established in 1977 by friends, colleagues and former students of Dr. Robins.

Peggy Sansone Memorial Lectureship. Created in 2002 by Anthony F. Sansone, Jr. and the Peggy Sansone Special Angel Foundation to promote the exchange of ideas and scientific information on the topic of depression and the role of spirituality in personality development, happiness and mental health. The lecture is a memorial to Mr. Sansone's wife, Peggy Sansone.

Julio V. Santiago Leadership. Established in 1999 by the Department of Pediatrics as a lasting tribute to Julio V. Santiago, M.D., for his long-standing contributions to the areas of diabetes, endocrinology and metabolism.

The Rena Schechter Memorial Lectureship in Cancer Research in the Department of Medicine. Established in 1996 by Dr. Samuel E. Schechter to create a lectureship in cancer research in memory of his wife, Rena Schechter.

Dr. Alexander and Helena Schonfeld Lectureship. This lectureship was established in 1994 by Mrs. Helena Schonfeld, in honor of her son, Gustav Schonfeld, Professor of Medicine at Washington University School of Medicine.

Henry G. Schwartz Lectureship. Created in 1983 by former residents and colleagues from the neurosurgery department to honor Dr. Schwartz.

Wendell G. Scott Memorial Lectureship. Established in 1972 by friends and colleagues of Dr. Wendell G. Scott.

Major G. Seelig Lectureship. Established in 1948 in the field of surgery by friends of Dr. and Mrs. Seelig.

Philip A. Shaffer Lectureship. Founded in 1957 by friends of Dr. Shaffer in recognition of his accomplishments in biochemistry.

Earl E. and Wilma Shephard Orthopaedics/Otolaryngology Memorial Lecture. Established in 1994 through a bequest by Dr. and Mrs. Shephard.

Frank O. Shobe Lectureship. Established in 1986 by friends of Dr. Shobe to honor him as a physician and teacher.

Donald C. Shreffler Genetic Lectureship. Established in 1995 by Mrs. Donald C. Shreffler as a memorial to her husband.

Eduardo Slatopolsky Lectureship. Established in 1988 by Mr. and Mrs. William Wolff in honor of Dr. Slatopolsky's 25-year association with the School.

C. R. Stephen, M.D., F.F.A.R.C.S. Fund for Lecture and Clinical Research in Anesthesiology. Established in 1986 by former students, residents, faculty and friends in honor of Dr. Stephen, first Head of the Department of Anesthesiology.

Sterling Drug Visiting Professorship in Pharmacology. Established in 1986 to honor Ernst Zander, M.D., former medical director of Sterling Drug, Inc.

Arthur W. Stickle Lectureship in Pediatric Ophthalmology. Established by Arthur and Emily Stickle in 1995 with their generous gift in recognition of Dr. Stickle's medical training in the Department of Ophthalmology and Visual Sciences and his special professional contribution to the field of pediatric ophthalmology.

The Richard A. and Betty H. Sutter Visiting Professorship in Occupational and Industrial Medicine. Established in 1985 by Dr. and Mrs. Sutter to encourage opportunities for students, faculty, other physicians and the St. Louis community to expand the understanding and practice of occupational medicine.

Jessie L. Ternberg Pediatric Surgery Visiting Lectureship. Made possible from a fund established in 1977 by Mr. Meyer Kopolow to honor Dr. Ternberg.

Robert J. Terry Lectureship (1939) and Visiting Professorship (1982). Established by alumni and Charles S. Terry, his son, respectively, "for the purpose of fostering greater appreciation of the study of anatomy."

Donald L. Thurston Memorial Lectureship. Established in 1988 by his wife, Dr. Jean Holowach Thurston, and his colleagues and friends, the lecture-ship is devoted to the history of biomedical advances.

Leonard J. Tolmach Lectureship. Established in 1995, this lectureship was endowed by friends and colleagues to honor the legacy of Dr. Tolmach. The lecture theme is radiation biology in clinical radiation oncology.

Mildred Trotter Lectureship. Established in 1975 by friends and former students of Mildred Trotter to bring a distinguished woman scientist to the School of Medicine each year.

Rudolph A. Tuteur Pulmonary Lectureship. This lectureship is endowed by family, friends, patients and colleagues of the Tuteur family to memorialize Rudolph A. Tuteur. The goal of this annual fall event is to promote further understanding of problems associated with chronic pulmonary disease from which he suffered.

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## ***Course Evaluations***

Systematic course evaluation is performed for each year of the curriculum by faculty peers, teaching faculty and students. This system permits problem identification, ensures timeliness of feedback, promotes discussion of new teaching methodologies, allows curriculum inventory, recommends changes in course offerings and provides better integration of the curriculum. These reviews are guided through a Curriculum Evaluation Committee (CEC) for each of the preclinical years of instruction and another CEC to evaluate both clinical years (i.e., CEC I = first year, CEC II = second

year, CEC III = third and fourth years).

The Office of the Associate Dean for Medical Student Education oversees the evaluation system, which is coordinated by Ms. Kelly Noll in the Curriculum Evaluation Office (362-3404). The collected data are forwarded to the respective coursemasters, the Committee on Medical Education and the Academic Affairs Committee.

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## ***Adviser System***

Student advising occurs within two broad programs.

1. Clinical Advisers: The first-year students are assigned in small groups to selected faculty advisers, representing both basic science and clinical faculty. These groups meet on an informal basis, usually in the hospital setting. The students and faculty member explore mutually interesting topics which may include seeing patients, observing procedures, discussing health insurance or reading journal papers. The advisers serve as faculty contacts but do not have any formal academic advisory role.

Each first-year student is invited to join one of the three academic societies. Entering students are divided equally among the societies. Incoming first-year students and their faculty advisers share the same academic society.

2. Career (fourth-year) Advisers: Each third-year student selects a fourth-year adviser from a list of potential faculty advisers. In most cases, the adviser is a faculty member in the field in which the student will be seeking a residency appointment. The career advisers have responsibility for reviewing the student's choice for fourth-year electives and making appropriate recommendations for the structure and content of the elective year. In addition, fourth-year advisers serve as valuable resources for information about residency programs.

In addition to the advising programs described, students seek informal advising from faculty with whom they have had contact, either through classroom work, research or clerkships. Students also have faculty and alumni contact through membership in the academic societies.

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## **Degree Programs**

The Washington University School of Medicine offers four programs leading to the M.D. degree: a regular four-year program, a five-year program, the M.A./M.D. program and a combined M.D./Ph.D. program.

[Doctor of Medicine](#)

[Master of Arts and Doctor of Medicine](#)

[Doctor of Philosophy](#)

[Doctor of Medicine and Doctor of Philosophy](#)

## ***Doctor of Medicine***

By conferring the M.D. degree, the University certifies that the student is competent to undertake a career as a doctor of medicine. It certifies further that, in addition to medical knowledge and skills, the graduate possesses qualities of personality — compassion, emotional stability and a responsible attitude — essential to an effective professional life.

A course of medical education for the M.D. degree ordinarily consists of a minimum of four years of study. Students recommended for the Doctor of Medicine degree must be of good moral character, they must have completed an entire academic course of instruction as matriculated medical students, they must have passed all required subjects or the equivalent and have received satisfactory grades in

the work of the full academic course, and they must have discharged all current indebtedness to the University. Individuals applying for licensure must be at least 21 years of age. The school requires that students planning to practice clinical medicine take the USMLE Step 1 and Step 2 examinations.

At the end of the final academic year, students who have fulfilled these requirements will be eligible for the M.D. degree.

### **Five-Year Program**

In addition to the regular four-year program leading to the M.D. degree and the M.A./M.D. degree program, students are permitted to spend one additional year in an academic program in a medical or medically related field. In exceptional circumstances, an additional year may be permitted. The student may receive a stipend but may not be considered an employee of the University. The program must be arranged with an academic adviser and is subject to the approval of the Associate Dean for Student Affairs.

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### ***Master of Arts and Doctor of Medicine***

The objective of the M.A./M.D. Program is to provide one full year of individual, full-time, in-depth research experience for medical students in preparation for a career in academic medicine. Program participants absent themselves from medical school and spend 12 months working on basic biomedical research or hypothesis-driven clinical research in the lab of a faculty member. Degree requirements include a presentation before a research advisory committee, submission of a publication-quality manuscript and participation in a research ethics seminar.

No academic credit toward the M.D. degree will be given, but research and thesis may be continued as senior elective for credit. Fellowship stipends and other support are available through the Howard Hughes Medical Institute (basic science research), Doris Duke Foundation (clinical research), the National Institute of Diabetes & Digestive & Kidney Diseases (GI, hepatology, endo-crinology, nutrition, nephrology and hematology research) and the J. Max Rukes Fund (endocrine and metabolism research). Students unable to qualify for one of these awards may also apply for support from the dean of the medical school. Funding amounts may vary and some of these sources have deadlines in early January. Please contact the M.A./M.D. program administrator at (314) 747-6787 for details.

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### ***Doctor of Philosophy***

The Division of Biology and Biomedical Sciences offers predoctoral programs in Biochemistry, Chemical Biology, Computational Biology, Developmental Biology, Evolutionary and Population Biology, Immunology, Molecular Biophysics, Molecular Cell Biology, Molecular Genetics, Molecular Microbiology and Microbial Pathogenesis, Neurosciences and Plant Biology. These educational activities are organized on an interdepartmental basis by the faculty of all clinical and preclinical departments of the School of Medicine, as well as the departments of Biology and Chemistry in the School of Arts & Sciences. All degrees are awarded through the Washington University Graduate School of Arts & Sciences. Additional information about the Divisional programs may be obtained by contacting:

Graduate Studies Office  
Washington University School of Medicine  
660 S. Euclid Ave., Campus Box 8226  
St. Louis, MO 63110-1093  
(800) 852-9074  
<http://dbbs.wustl.edu>

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## ***Doctor of Medicine and Doctor of Philosophy***

Washington University offers a combined M.D./Ph.D. degree program that utilizes the resources of the Division of Biology and Biomedical Sciences and the School of Medicine under the auspices of the Medical Scientist Training Program (MSTP). The purpose of the program is to train individuals in medicine and biomedical research to prepare them for careers as physician scientists. The program was inaugurated in 1969, and is one of the oldest and largest in the country. The program, normally completed in seven years, has been highly successful; more than 80 percent of those who have completed postgraduate training are actively involved in research programs at leading institutions.

All students in the program receive financial support in the form of stipends (currently \$22,000 per year), health coverage, disability and life insurance, and full tuition remission for both the M.D. and Ph.D. phases of training.

Only students who have spent the equivalent of at least two semesters in laboratory research should apply to the Medical Scientist Training Program. Applicants must meet the requirements for admission to both the School of Medicine and the Graduate School of Arts and Sciences, although the Graduate Record Examination is not required. In addition, students planning to concentrate in disciplines related to the chemical or physical sciences should have completed mathematics through calculus, physics and physical chemistry, and advanced organic chemistry. A course in differential equations also is recommended. For those students whose major interests are in the more biological aspects of medical science, the quantitative requirements for chemistry are less extensive, but a strong background in mathematics, chemistry and physics is still important. Although most individuals enter the program as first-year students, applications will be accepted from students in their first or second year at this medical school. The program matriculates approximately 25 new students each year, which represents one-fifth of the entering medical school class.

The program consists of three parts: 1) two years of an enhanced medical curriculum, 2) at least three years of original research toward a thesis to satisfy the requirements for the Ph.D. degree, and 3) at least 15 months of clinical training based on a student's career goals. Both degrees are awarded at the completion of the program.

Funding support commences when the student begins the program, either in June or at the beginning of the medical school year. Students matriculating in June undertake a research rotation with a faculty member of their choosing.

While the Medical Scientist Training Program includes all medical courses required for the M.D. degree, it incorporates a high degree of flexibility for individuals through a wide range of electives and graduate courses, some of which may be taken during the first year of the medical curriculum. Every effort is made to individualize each student's curriculum based on previous background and current interests. The medical and Ph.D. curricula are integrated, which permits students to take Ph.D. coursework in lieu of certain medical school coursework. In this way, students may substantially meet the coursework requirements of the Ph.D. program during the first two medical school years. The MSTP director and co-director meet with students individually to help them decide on a personalized curriculum and appropriate laboratory rotations. Lab rotations are executed over the summer.

The MSTP Committee monitors the performance of each student, and a high scholastic standing as well as a commitment to research is expected.

Students normally spend between three and five years in the Graduate School of Arts and Sciences or the School of Engineering satisfying the following requirements:

- 1) Completion of required graduate coursework;
- 2) Successful performance in qualifying examinations;
- 3) Execution of original research suitable for a dissertation;
- 4) Defense of the thesis; and
- 5) Completion of a one-semester teaching assistantship.

The Ph.D. degree may be obtained in the Program in Biomedical Engineering or any of the programs of the Division of Biology and Biomedical Sciences. The Division, now in its 31st year, is a leader in interdisciplinary biomedical education. Member departments of the Division include all clinical and preclinical departments of the Medical School, as well as the Departments of Biology and Chemistry. These departments jointly provide training in the following interdisciplinary programs:

Biochemistry  
Chemical Biology  
Computational Biology  
Developmental Biology  
Evolutionary and Population Biology  
Immunology  
Molecular Biophysics  
Molecular Cell Biology  
Molecular Genetics  
Molecular Microbiology and Microbial Pathogenesis  
Neurosciences

Students may conduct research under any of the faculty affiliated with these programs or faculty in the Biomedical Engineering program.

A series of monthly seminars featuring physician scientists is held for M.D./ Ph.D. students. These seminars are aimed at stimulating student interest in clinical medicine, increasing awareness of major research problems in clinical medicine and exposing students to diverse career paths in academic medicine.

M.D./Ph.D. students attend an annual weekend retreat during which students present their research. The retreat also features discussions led by experts on topics selected by students.

To keep students in the Ph.D. phase of training up to date on their clinical skills, monthly opportunities are offered for clinical interactions. Students are matched individually with a clinical mentor in the specialty of their choice. These interactions include going on rounds and attending conferences.

A special two-week non-graded tutorial for M.D./Ph.D. students facilitates their transition into the clinical phase of training.

MSTP students are required to complete a minimum of 15 months of clinical training. Opportunities exist to meet part of the requirement while engaged in Ph.D. training. Students may opt to do up to 24 months of clinics. The intensive clinical training is the last formal requirement for the M.D. degree. Both the Ph.D. and M.D. degrees will be granted at the conclusion of clinical training.

Application Procedure: Students interested in applying to the Medical Scientist Training Program must apply to Washington University School of Medicine, which participates in the American Medical College Application Service (AMCAS). The MSTP application may be downloaded after July 1 at [www.mstp.wustl.edu](http://www.mstp.wustl.edu). Those who wish additional information about the program may contact:

Medical Scientist Training Program  
Washington University School of Medicine  
Campus Box 8226, 660 S. Euclid Ave.  
St. Louis, MO 63110-1093  
(800) 852-4625  
E-mail: [mstp@dbbs.wustl.edu](mailto:mstp@dbbs.wustl.edu)  
Web site: [www.mstp.wustl.edu](http://www.mstp.wustl.edu)

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## **Applying for Admission**

For updated information, check our Admissions home page:  
<http://medschool.wustl.edu/admissions>

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## ***Preparation for the Study of Medicine***

Entrance requirements to the School of Medicine include:

1. Evidence of superior intellectual ability and scholastic achievement;
2. Completion of at least 90 semester hours of college courses in an approved college or university;
3. Completion of the Medical College Admission Test of the Association of American Medical Colleges; and
4. Evidence of character, a caring and compassionate attitude, scientific and humanitarian interests, effective communication skills, and motivation suitable for a career in medicine.

Chemistry, physics and mathematics provide the tools for modern biology, for medicine and for the biological basis of patient care. Thus, a firm grounding in these subjects is essential for the study of medical sciences. Entering students are expected to have had at least the equivalent of one-year courses at the undergraduate level in physics and biology; to have studied mathematics through calculus, including integral equations and differential equations; and to have a background in chemistry, including one year of general or inorganic chemistry and one year of organic chemistry. In selected instances, one or more of these prerequisites may be waived by the Committee on Admissions, but applicants are strongly advised to pursue their interests in these and in other areas of science.

A major goal of undergraduate college work should be development of the intellectual talents of the individual. This often involves the pursuit of some area of knowledge in-depth, whether in the humanities, social sciences or natural sciences. At the same time, a diversity of background is encouraged in order to provide a necessary foundation for cultural development. Specific courses, other than the few in the natural sciences, are not prerequisites because a great variety of courses may prepare students for the many roles they may play in their medical careers.

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## ***Policy for International Students***

The admission decision at Washington University School of Medicine is based on academic and personal merit and not on the ability of the student to pay the costs of education. However, individuals who are not citizens of the United States of America or who do not hold U.S. Permanent Resident Visa status are not eligible for financial aid due to regulations covering many programs used by the School to fund financial assistance. Therefore, in order for the School to complete the required documents which are necessary for issuance of a visa, the student must document, by a date and in a manner designated by the School, that the necessary amount of funds, as established by the School, is available to pay the costs of education (tuition and living expenses) for the anticipated period of enrollment, normally four years. Documentation of the required amount of financial resources may be by a letter of credit or by deposit of funds in an escrow account with a bank designated by the School.

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## ***Application Procedure***

Washington University School of Medicine participates in the American Medical College Application Service (AMCAS) of the Association of American Medical Colleges. AMCAS provides a centralized system for applying to any participating medical school with only one application and one set of official transcripts of academic work.

The AMCAS Application for Admission, common to all participating medical schools, is distributed by the AMCAS and pre-professional advisers. Applicants are urged to file their applications as early as possible.

Applicants to the first-year class must submit their AMCAS application so that it is postmarked no later than December 1 of the year prior to that in which they want to matriculate. On receipt of the

application from AMCAS, the Office of Admissions promptly contacts the applicant regarding the additional steps to be taken to complete the application. These include completing a supplemental application via the Internet at [medschool.wustl.edu/](http://medschool.wustl.edu/) admissions, submission of letters of recommendation and payment of a nonrefundable Application Service Fee of \$50. Applicants can check the status of their application via the Internet at the same web site as noted above. Once the application is complete, the Committee on Admissions evaluates it.

The Committee would like to interview every applicant; however, since this would involve several thousand applicants, it is physically impossible to accomplish. Therefore, selected applicants are invited for a personal interview, as well as a tour of the School of Medicine and the Washington University Medical Center. This visit provides an opportunity for the applicant to meet and talk with students and faculty members.

If an applicant is planning an interview trip that will include the St. Louis area, it is appropriate to write the Interview-Appointments Secretary, Committee on Admissions, Box 8107, Washington University School of Medicine, 660 S. Euclid Ave., St. Louis, MO 63110-1093, to inquire if an interview has been authorized.

Communication by facsimile and e-mail is encouraged. The fax number for the Committee on Admissions is (314) 362-4658. The e-mail address is [wumscoa@msnotes.wustl.edu](mailto:wumscoa@msnotes.wustl.edu). The inquiry should be made at least three weeks in advance of the anticipated travel. The Office of Admissions is open weekdays from 8:30 a.m. to 5 p.m. Central Time.

Admission decisions are made by the Committee on Admissions. Washington University School of Medicine operates on a rolling admissions schedule beginning October 15, and applicants are notified as soon as a final decision has been made on their application. By April 15, every applicant should have a final decision: accepted, waiting list, or not accepted.

Upon notification of acceptance for admission to the School, the applicant is required to file a Statement of Intent within two weeks. Three options are presented: 1) accept the offer of admission and submit the \$100 acceptance deposit; 2) accept the offer of admission, submit the \$100 deposit and request financial aid materials; or 3) decline the offer of admission. The \$100 acceptance deposit reserves a place in the class and is applied to the tuition charge at the time of matriculation. If an accepted applicant withdraws from the class with written notification to the Admissions Office prior to May 15, the deposit is refunded. The School of Medicine abides by the traffic rules regarding application timelines as established by AMCAS. Accepted applicants who are non-compliant may have their acceptance into the class rescinded.

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## ***Full-Tuition Scholarships***

In 1978, the School of Medicine established a scholarship program that based selection on merit rather than financial need. As one of the first merit scholarship programs for medical students, the Distinguished Student Scholarship Program has recognized and rewarded academic excellence and personal achievement for 27 years. Over this time, the School of Medicine increased the number of merit scholarships with the establishment of the Distinguished Minority Student Scholarship Program. And, to honor outstanding alumni of Washington University, the Medical Center Alumni Association created in 1989 the Distinguished Alumni Scholarship Program. In 1998, the Barnes-Jewish Hospital Medical Staff Association committed to funding one full-tuition, four-year scholarship to one student in each entering class. Beginning with the 2002-2003 academic year, one additional "named" scholarship was made available through the generosity of a donor.

Most merit-based scholarships are awarded to students in the first-year class and are subject to annual renewal. Recipients of these scholarships are expected to maintain academic excellence. If a scholarship is not renewed, the student may file for financial aid from the School. For scholarship recipients who document financial need above the full-tuition scholarship, additional funds are available to provide support up to the total cost of education. Scholarship recipients may not concurrently participate in the School's Medical Scientist Training Program or the Armed Forces Health Professions Scholarship Program.

## **Distinguished Student Scholarships**

Up to five full-tuition scholarships may be awarded annually to members of the entering first-year class. In early fall 2004, selected applicants for admission to the School's 2005 first-year class will be invited to file applications for scholarship consideration. Final selection of scholarship recipients will be made by a committee of the faculty and will be based on demonstrated superior intellectual achievement as well as an assessment of the applicant's character, attitude, motivation and maturity. The announcement of the 2005-2006 scholarship recipients will be made during the week following the on-campus interviews on Saturday, May 7, 2005.

### **Distinguished Minority Student Scholarships**

Up to five scholarships may be awarded to eligible minority students in the entering first-year class. A Scholarship Selection Committee identifies those to be considered for scholarship, and award notifications follow within two weeks.

### **Distinguished Alumni Scholarships**

Up to four full-tuition scholarships are awarded annually to members of the entering first-year class. The application procedure and selection process are the same as for the Distinguished Student Scholarships. Since 1989, Distinguished Alumni Scholarships have been named in honor of:

Walter F. Benoist, M.D.  
Leonard Berg, M.D.  
Grace E. Bergner, M.D.  
Stanley J. Birge, M.D.  
Eugene M. Bricker, M.D.  
J. William Campbell, M.D.  
David B. Clifford, M.D.  
Justin J. Cordonnier, M.D.  
John D. Davidson, M.D.  
Robert C. Drews, M.D.  
Ronald G. Evens, M.D.  
I.J. Flance, M.D.  
James W. Fleshman, M.D.  
Mark E. Frisse, M.D.  
Bernard T. Garfinkel, M.D.  
Deborah J. Gersell, M.D.  
David Goldring, M.D.  
Samuel B. Guze, M.D.  
Paul O. Hagemann, M.D.  
Alexis F. Hartmann, M.D.  
Alexis F. Hartmann Jr., M.D.  
John C. Herweg, M.D.  
Robert S. Karsh, M.D.  
John M. Kissane, M.D.  
Ira J. Kodner, M.D.  
Allan E. Kolker, M.D.  
Stuart A. Kornfeld, M.D.  
Nicholas T. Kouchoukos, M.D.  
William M. Landau, M.D.  
Virgil Loeb, M.D.  
Robert H. Lund, M.D.  
Alan P. Lyss, M.D.  
Philip W. Majerus, M.D.  
Gerald Medoff, M.D.  
Paul A. Mennes, M.D.  
J. Neal Middelkamp, M.D.  
Benjamin Milder, M.D.  
Barbara S. Monsees, M.D.  
Carl V. Moore, M.D.  
D. Michael Nelson, M.D., Ph.D.  
Robert C. Packman, M.D.  
Charles W. Parker, M.D.  
Mary L. Parker, M.D.  
Alan L. Pearlman, M.D.  
Frederick D. Peterson, M.D.  
Gordon W. Philpott, M.D.

Gary A. Ratkin, M.D.  
Edward H. Reinhard, M.D.  
Fred C. Reynolds, M.D.  
George Sato, M.D.  
Gustav Schonfeld, M.D.  
Clay F. Semenkovich, M.D.  
Hyman R. Senturia, M.D.  
Gary D. Shackelford, M.D.  
Penelope G. Shackelford, M.D.  
Barry A. Siegel, M.D.  
Arnold W. Strauss, M.D.  
Steven L. Teitelbaum, M.D.  
Jessie L. Ternberg, Ph.D., M.D.  
Mildred Trotter, Ph.D.  
Stuart Weiss, M.D.

Distinguished Alumni Scholarship Program honorees 2004-2005:

Sidney Goldring, M.D. '47  
Maurice Lonsway, M.D. '50  
Donald Sessions, M.D. '62  
Larry Shapiro, M.D. '71

Barnes-Jewish Hospital Medical Staff Association Scholarship

One full-tuition, four-year scholarship will be awarded to a student in each entering class beginning in 1999. Selection of the Barnes-Jewish Hospital Medical Staff Association Scholar is the same as for the Distinguished Student Scholarship.

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## ***Third-Year Class Transfer Program***

Each year, Washington University School of Medicine accepts a limited number of transfer students into its third-year class depending on the availability of positions. Transfer applications are accepted from well-qualified second-year students who are enrolled in good standing and eligible to continue in their L.C.M.E.-accredited U.S. medical schools. Applicants must also have a compelling personal reason for requesting transfer and must have the full approval of the dean of their current school. Accepted students are required to successfully complete the USMLE Step 1 examination.

Transfer application forms for admittance into the third-year class are available after October 1 for the following academic year. The deadline for submission of applications is March 31. Those applicants selected for interview will be invited to visit the Medical Center. Applicants will be notified of the decision of the Committee on Admissions by May 15 or when a position becomes available. Inquiries should be directed to:

Third-Year Class Transfer Program  
Washington University School of Medicine  
Campus Box 8077, 660 S. Euclid Ave.  
St. Louis, MO 63110-1093  
Phone: (314) 362-6844  
Fax: (314) 362-4658  
E-mail: [wumscoa@msnotes.wustl.edu](mailto:wumscoa@msnotes.wustl.edu)

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## **Financial Information**

[Cost of Education](#)

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[Financial Assistance](#)

## ***Cost of Education***

For the first-year class matriculant, tuition and housing rates for the 2004-2005 academic year are listed below. Students who enter in 2004 will benefit from a tuition stabilization plan, which provides that their annual tuition will be constant over four years. The items listed below provide an estimate of the expenses for a single student in the 38-week first-year class. The total of these figures suggests a basic minimum budget of approximately \$48,648. Allowances for entertainment, travel, clothing and other miscellaneous items must be added to this estimate.

Tuition (includes Student Health Service and Microscope Lending Plan):	\$38,330
Books, supplies and instruments:	\$1,820
Housing and food:	\$8,498

### **Student Health Service**

The Student Health Service provides comprehensive health care, including hospitalization, for all full-time students in the School of Medicine. Long-term group disability insurance is provided for medical students. Coverage may be converted to an individual portable policy prior to graduation. All full-time students in the School of Medicine are covered by a \$10,000.00 life insurance benefit.

### **Microscope Lending Plan**

Microscopes that meet the technical requirements set by the faculty are provided at no additional charge to each student in the first- and second-year classes. The plan saves students the high cost of microscope purchase and makes available to them a superior quality instrument.

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## ***Registration, Payment of Financial Obligations and Refunds***

For the convenience of our students, the Washington University billing system provides a central financial account against which most student expenses incurred at the University will be posted, including but not limited to tuition, dormitory charges, parking, library fines, etc. This policy, when referring to tuition and other charges, includes any and all charges posted to this account.

All payments of tuition and other University charges are due and payable on the dates specified in the published calendars of the programs in the School of Medicine. Failure of a student to register when required and pay tuition and other charges incurred on or before the date specified in the published calendar will result in a late fee of \$50 to be added to the amount due. The late fee will be imposed seven (7) days after the due date if full payment has not been received. Tuition and other charges are usually payable twice a year, at registration time and again at the middle of the academic year as listed on the schedule on the academic calendar.

Any payment due from the student and not paid by the specified date will accrue interest at the usury rate in effect on the first business day of the month in which the payment is due. This fee will be imposed on any accounts not paid in full within 30 days of the due date. Any amount not paid when due plus accrued interest thereon must be paid in full within three months of the due date to avoid suspension from classes.

If a student fails to settle such unpaid amounts within three months of the original due date, the School will not release the student's academic record, grade reports or transcript pending settlement of the unpaid account. A student who has not satisfied all of his/her delinquent financial obligations to Washington University (tuition, Olin Residence Hall rental, parking, etc.) one month before the end of the end of the academic year will not be allowed to progress to the next academic year, or be issued a diploma.

Students who rely on financial aid funds to meet their obligations should submit their applications for processing according to application deadlines published by the Office of Financial Aid. Deadlines allow for receipt of financial aid funds if applications are filed by the deadline. The Office of Student Financial

Aid will assist students with loan applications and financial planning upon request.

A student who withdraws from the School will receive a pro rata refund of tuition and appropriate fees. The refund will be based on the ratio of the class days enrolled (from the first day of classes to the termination date) to the total number of class days in the term for which tuition and fees were paid. It is understood that the date on which a student formally notifies the Registrar's Office in writing of the decision to withdraw from the School of Medicine shall be regarded as the termination date, with no retroactive clause to be accepted. A prospective date will be accepted, however. If tuition and fees were paid entirely or in part by financial aid from the School, the refund will be applied first to the total repayment of the accounts from which financial aid was drawn, with any remaining refund balance given to the student. Financial aid received in excess of the costs of tuition and fees must be refunded by the student to the School on the same pro rata basis as calculated for the tuition refund outlined above. Examples of the application of the refund policy may be requested from the Registrar's Office.

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## ***Financial Assistance***

The ability to finance a medical education at Washington University does not influence the student selection process. As all students accepted for admission have proven scholastic ability, financial assistance is awarded solely on the basis of documented financial need which cannot be met by student and family resources. Students who consider themselves financially independent of their parents must arrange for loans to replace the amount of support parents are analyzed to have the potential to contribute. The School of Medicine's Office of Financial Aid (Box 8059) will assist students in making these arrangements.

In responding to the Admissions Committee's offer of admission, an accepted student may request financial aid application materials. The Financial Aid Office acknowledges the student's intent and provides instructions for completing the FAFSA. Everyone applying for financial aid must complete a Free Application for Federal Student Aid (FAFSA) and designate Washington University School of Medicine, School Code #G24620, as a recipient. Medical school financial aid application documents and detailed instructions will be made available after January 1, 2005.

The financial aid application materials solicit information about the applicant and parents, including a detailed description of resources and liabilities. If an applicant's parents are separated or divorced, the financial information is required from both biological parents (excluding income and assets of their spouse, if remarried). If the applicant is married, similar information is required of the spouse. The School expects the applicant to complete and submit the financial aid documents within two weeks from the date the applicant receives them. Official copies of both biological parents' and the applicant's U.S. Individual Income Tax Returns complete the data required for financial aid consideration.

While "permanent residents" of the United States are eligible for most federal financial aid programs, need-based financial aid from Washington is only awarded if the applicant and both biological parents can provide official, audited documents with the same detailed information as provided on a U.S. income tax return. All information is held in strict confidence.

Financial aid awards are credited toward payment of tuition and fees. Proceeds from loans may be disbursed directly to the borrower. The loan portion of an award will be funded through the resources of the School of Medicine or through the federal Stafford Loan program. All loans awarded by the committee are free of interest while a student is enrolled in the School. Financial aid awards are made for a given academic year. Students may reapply for financial assistance in succeeding years if they remain in good academic and personal standing, and if there is continued financial need. Awards made to a student may vary from year to year, depending upon the student's needs and upon the availability of funds to the Committee. Students are responsible for filing applications for renewal of awards in the spring of each year.

The committee holds that students receiving assistance have an obligation to notify the committee in writing if their financial situation changes, for example, through employment or receipt of a scholarship not anticipated at the time the application was submitted.

First- and second-year students are urged not to accept employment during the academic year. A



number of fourth-year students find employment in hospitals within the Medical Center. The personnel office provides assistance to students' spouses seeking employment.

### **Standards for Satisfactory Academic Progress for Financial Aid Eligibility**

Federal law and regulations require that all students receiving financial assistance from Federal Title IV funds maintain satisfactory academic progress. The policy presents the standards adopted by the Washington University School of Medicine and applies to all students.

In order to maintain satisfactory academic progress, the maximum time frame of full-time enrollment for completion of each program is as follows:

Four-year M.D. program: 6 years  
Five-year M.D. program: 7-1/2 years  
M.A./M.D. program: 7-1/2 years (or 9 years if a 2-year M.A. is pursued)

Periods of non-enrollment are NOT counted in the measurement of satisfactory academic progress but all periods of attendance, regardless of whether the student received Title IV aid, are counted.

This policy is applied in the context of each individual student's enrollment status in order to accommodate the student who does not enroll on a full-time basis. For example, if a student enrolls in a four-year program, the full-time student would meet the 150 percent maximum after six years of full-time enrollment, and the half-time student is expected to complete in twelve years. If a student vacillates between full-time and half-time enrollment, that student would have a maximum time frame between six and 12 years, and the maximum time frame for that student would be continuously adjusted.

Academic requirements for the M.D. degree include the satisfactory completion of the curriculum designated by the faculty. The progress of each student working toward an M.D. degree is monitored carefully by the Committee on Academic Evaluation of Students (CAES). Refer to the Assessing Academic Achievement area of the Admissions and Educational Program section.

A student failing to meet the standards of progress as determined by the Committee on Academic Evaluation of Students shall be placed on financial aid probation. While on probation the student may receive financial assistance for one trimester, semester or equivalent time period. At the conclusion of this period, the student must have achieved compliance with each standard. A student who does not achieve compliance with each standard by the conclusion of the probationary period is suspended from financial aid eligibility. The Office of Student Financial Aid must notify a student of implementation of probationary status and/or suspension.

A student shall be reinstated for financial aid eligibility at such time as that student has completed satisfactorily sufficient coursework to meet the standards of progress. A student on financial aid probation or suspension may appeal that status by indicating in writing to the Director of Student Financial Aid the existence of mitigating circumstances which should result in reinstatement of financial aid eligibility. Each appeal will be considered on its merit by the Committee on Student Financial Aid.

The Director of Student Financial Aid shall have primary responsibility for enforcement of this policy. The director shall provide in writing to each student at the time of initial enrollment a copy of this policy. The director shall ascertain at the time of each disbursement of funds and prior to certification of a financial aid application that the student is in compliance with the policy.

### **Scholarship Funds**

Helen M. Aff-Drum Scholarship Fund. Established in 1988 to provide scholarship support to financially deserving medical students.

African-American Medical Alumni Scholarship. A two-year full tuition scholarship supported by African-American alumni and friends of the School of Medicine will be awarded to a student in the first-year class for academic excellence, personal achievement and service to the African-American community.

American Medical Association — Education and Research Foundation Medical Student Assistance Fund. Begun in 1983, donors' gifts supplement the Foundation's gift to support excellence and contribute to the Distinguished Student Scholarships and Distinguished Alumni Scholarships Program.

Anderson Student Scholarship. Established through bequest in 2001 by Rolf L. Anderson, M.D., '62.

Isak and Breine Ascher Scholarship Fund. The late Dr. Eduard Ascher, M.D., '42, established this scholarship through a trust to memorialize his parents, who were lost in the Holocaust during WWII. He chose Washington University School of Medicine because of their willingness to "give a chance" to an Austrian refugee.

Dr. William Monroe Baker Fund. Established in 1988 under the will of Miss Lola Braxton in memory of Dr. Baker to provide scholarship assistance to worthy students who would be otherwise unable to obtain a medical education.

Barnes-Jewish Hospital Medical Staff Association Scholarship. Established in 1998 by the Barnes-Jewish Hospital Medical Staff Association to provide financial assistance to students based on academic excellence.

Floyd A. and Rita Sue Barnett Scholarship Fund. Established in 1994 from a trust agreement (1989) of Floyd and Rita Sue Barnett for scholarships for students who are academically well-qualified and financially deserving.

The Dr. Joseph A. and Helene H. Bauer Scholarship Fund. Created in 1987 by Dr. and Mrs. Joseph A. Bauer to provide scholarship support to academically well-qualified and financially deserving medical students.

Albert G. Blanke, Jr. Endowed Scholarship Fund. Established by a generous gift in 1982, the fund provides scholarship assistance for deserving students in the School of Medicine.

Isabel Valle Brookings Scholarship Fund. Established in 1957 by Isabel Valle Brookings (Mrs. Robert S.) for scholarships and loans in the School of Medicine.

Jane Stewart and Robert S. Brua, M.D. Scholarship Fund. Established in 1996 through the generosity of Dr. Brua.

Ruth Elizabeth Calkins Scholarship Fund. Established by Dr. Delevan Calkins in honor of his granddaughter.

Gilbert L. Chamberlain, M.D. Scholarship Fund. Created in 1971 by Dr. Gilbert L. Chamberlain to be used to aid worthy students in acquiring their medical education.

Dr. Pierre I. Chandeysson Scholarship Fund. Created in memory of Dr. Chandeysson by his daughter, Carol M. Chandeysson, to provide scholarship assistance to worthy students.

Cecil M. Charles — Nu Sigma Nu Medical Student Scholarship Fund. Established by the Nu Sigma Nu Medical Fraternity in memory of Dr. Charles.

Class of 1945 Scholarship Fund. Established by the alumni from the class of 1945 in honor of their 45th reunion.

Class of 1956 Scholarship Fund. Established in 1996 by members of the class of 1956 in honor of their 40th reunion.

Class of 1964 Scholarship Fund. Established in 1993 by the alumni from the class of 1964 to support scholarships.

Class of 1968 Scholarship Fund. Established in 1998 by the alumni from the class of 1968 in honor of their 30th reunion to support student scholarships.

Class of 1969 Scholarship Fund. Established in 1994 by members of the class of 1969 in honor of their 25th reunion.

Class of 1970 Scholarship Fund. Established in 1996 by members of the class of 1970 in honor of their 25th reunion.

Class of 1971 Scholarship Fund. Established in 1999 by members of the class of 1971 in honor of their 25th reunion.

Class of 1972 Scholarship Fund. Established in 1999 by members of the class of 1972 in honor of their 25th reunion.

Class of 1973 Scholarship Fund. Established in 2000 by members of the class of 1973 in honor of their 25th reunion.

Class of 1974 Scholarship Fund. Established in 2002 by members of the class of 1974 for their 25th reunion and to honor the memory of their classmate, Jonathan Mann.

Class of 1976 Scholarship Fund. Established in 2000 by members of the Class of 1976 in honor of their 25th reunion.

Grace Strong Coburn Scholarship Fund. Created in 1962 through the bequest of Mrs. Grace Strong Coburn for scholarships in the School of Medicine.

Jack W. Cole, M.D. Scholarship. Established in 2002 by Mrs. Ruth Kraft Cole, in memory of her late husband, a 1944 graduate of WUSM, and to recognize Dr. Cole's deep appreciation for the education he received. Preference will be given to a student pursuing a career in academic medicine.

T. Griswold Comstock Scholarships. Established under the will of Marilla E. Comstock for students who would otherwise be unable to obtain a medical education.

Frederick J. Cornwell, Jr. Scholarship Fund. For scholarship and other financial help for worthy medical students and for medical students, interns and residents to use for research purposes.

Clark and Mildred Cox Scholarship. Established in 1998 with a donation from the Clark Cox Trust for scholarships for women.

Arpad Csapo, M.D. Memorial Scholarship Fund. Established in 1982 by Elise Csapo in memory of her husband, and by his friends and colleagues to provide assistance for students who have shown promise in fields relating to reproductive medicine.

William H. and Elizabeth Gray Danforth Scholars Program. Established in 1998 in honor of Chancellor Danforth's retirement. The Scholar recipients must demonstrate outstanding academic promise and a record of community service that reflects Dr. Danforth's values and actions.

Harriet Arey and John D. Davidson Scholarship. Established in 2000 by Harriet Arey and John D. Davidson for scholarships in the School of Medicine.

Davie Family Scholarship. Established by Joseph Davie, M.D. '68, and his family to support scholarships for deserving medical students.

Paul and Ruth DeBruine Scholarship. Established in 1994 by Dr. and Mrs. Paul DeBruine in honor of his 35th medical school reunion to provide scholarship support to academically well-qualified and financially deserving medical students.

Distinguished Minority Student Scholarships. Up to seven full-tuition scholarships are awarded to students in each first-year class for academic excellence and personal achievement.

Dr. Charles Drabkin Scholarship Fund. Created in 1964 to provide financial assistance to medical students.

Hazel B. Duncan Scholarship. This fund was established in 2003 through the bequest of Hazel B. Duncan, NU26.

Robert B. Fickel, D.D.S. Scholarship Fund. Received in 1990 and given in memory of Dr. Fickel's uncle, W. H. Fickel, M.D. '12. Awards are made to students after their first year of study.

Carl Fisch Scholarship Fund. Created in memory of Dr. Fisch by his daughter, Marguerite F. Blackmer. Provides support to students who demonstrate financial need.

Flance Medical Scientist Traineeship. Established in honor of faculty member and alumnus I. Jerome Flance, M.D. '35 by the Harry Edison Foundation for support of a student in the Medical Scientist Training Program.

George F. Gill Scholarship Fund. Instituted in memory of a former clinical professor of pediatrics.

Helen H. Glaser Scholarship for Women Medical Students. Established in 1999 by Robert J. Glaser, M.D., emeritus trustee and former faculty member, in memory of his wife, Helen H. Glaser, M.D. '47.

Anne T. and Carl Goetsch Scholarship. This fund was established in 2003 through the bequest of Dr. Anne T. Goetsch, M.D. '41, HS44, and Dr. Carl Goetsch, HS43, to support medical students.

Norman M. and Eleanor H. Gross Scholarship Fund. Established in 2001 through a bequest from Mr. Gross for financially needy medical students.

Paul H. and Lila L. Guttman Student Aid Fund. Established in 1976 to provide financial assistance to qualified medical students.

Paul O. and Nancy P. Hagemann Scholarship Fund. Established by Dr. and Mrs. Hagemann to assist academically well-qualified students with documented financial need.

Lee B. & Virginia G. Harrison Memorial Student Fund. Established in 1996 for scholarships for students who intend to pursue a career in internal medicine or family practice. Dr. Harrison was a 1927 graduate of the School of Medicine.

Harvielle-Bailey Scholarship. Established in 1970 under the will of Miss Isabel Bailey Harvielle as a memorial to Dr. Charles Poplin Harvielle and Dr. Steele Bailey, Jr., alumni of the School.

Dr. and Mrs. Charles Y. (Yueh-Gin Gung) Hu Scholarship Fund. Established in 2002 to provide a scholarship to a medical student of Chinese descent.

Dr. Grace Huse Memorial Fund. Provides scholarship awards for deserving Washington University medical students.

Jackson Johnson Scholarship Fund. Provided through a bequest in 1930 from Jackson Johnson.

Dr. Lorraine A. Johnsrud Scholarship Fund. Established in 1983 as a memorial to Lorraine from her classmates, friends and family to assist deserving medical students in the funding of their medical expenses.

Stanley C. Jones Scholarship Fund. Established in 1995 under the will of H. Roberta Jones as a memorial to her husband.

Henry J. Kaiser Family Foundation — Medical Century Club Scholarship Fund. Following the foundation's generous gift in 1980 for medical student scholarships, the Medical Century Club accepted the challenge to raise new scholarship funds to match an additional gift from the foundation.

George D. Kettelkamp Scholarship Fund. Established in 1969 by Mrs. Kettelkamp in memory of her husband, an alumnus of the School of Medicine.

M. Kenton King, M.D. Scholarship Fund. Created by the Executive Faculty to honor Dr. King at the time of his retirement in 1989 as Dean of the School of Medicine after having served in that position for 25 years.

Albert F. Koetter, M.D. Scholarship Fund. Established in 1978 by Mrs. Stella Koetter Darrow in memory of her father, an alumnus and former faculty member of the School of Medicine. At least one full-tuition scholarship is awarded annually on the basis of academic achievement and financial need.

Anne L. Lehmann Scholarship Fund. Established in 1983 to grant continued scholarship support to medical students.

Life and Health Insurance Medical Research Scholarship Fund. Established for the training of promising scholars intent upon a career in research and academic medicine.

Life Insurance Medical Scholarship Fund. Created in 1972 from residual funds in the Life Insurance Medical Research Fund, scholarship support is now awarded to students in the M.D. degree program.

Maude L. Lindsey Memorial Scholarships. Created in 1976 to assist students in the School of Medicine.

John R. Lionberger, Jr. Medical Scholarship Endowment Fund. Created in 1982 by Dr. John R. Lionberger to be used to aid worthy students in acquiring their medical education.

E.A. Marquard Memorial Student Scholarship. Established in 1994 from the E. Alfred Marquard Memorial Student Loan Fund to provide scholarships for deserving and needy financially deserving medical students.

Alma Mavis Scholarship Fund. Created in 1988 under the will of Alma Mavis to assist students intending to practice family (general) medicine.

Eliza McMillan Scholarship Fund. Provides assistance to young women in any of several schools of the University to secure an education.

Medical Center Alumni Scholarship Fund. Awarded on the basis of academic achievement and financial need.

Roy B. and Viola Miller Memorial Fund. Created in 1963 through the bequest of Roy B. Miller to provide scholarships for medical students and for post graduate students engaged in study and research in the medical sciences.

The Warren S. and Dorothy J. Miller Scholarship Fund. Established in 1982 through the bequest of Dorothy J. Miller to provide scholarships for any students engaged in studies leading to the degree of Doctor of Medicine and especially for those students with an aptitude and desire for the general practice in internal medicine.

Joseph J. and Ernesta G. Mira Scholarship Fund. Established in 1988 by Dr. and Mrs. Mira to provide assistance to students from the Alton, Illinois area, including the counties of Madison, Jersey, Calhoun, Greene and Macoupin.

The Monsanto Scholars Program. Established in 1990 with generous support from the Monsanto Fund, The Monsanto-Washington University Minority Medical Scientist Scholarship Program provides a monthly stipend and full tuition support for outstanding minority students who are committed to becoming academic physicians. Participants pursue both the M.D. and Ph.D. degrees in the six-year Medical Scientist Training Program (MSTP).

John and Ruth Musselman Medical Scholarship. Established in 1997 by the John & Ruth Musselman Medical Scholarship Trust to provide scholarships to deserving students.

Mr. and Mrs. Spencer T. Olin Fellowships for Women. Provides for annual financial support to women in any of several disciplines. Application deadline is February 1.

Spencer T. and Ann W. Olin Medical Fellowships. Created in an effort to help fill the continuing shortage of physicians who pursue careers in biomedical research, the awards are primarily for students in the Medical Scientist Training Program.

Dr. Roy W. Osterkamp Memorial Scholarship. The fund was established in 2003 by Mrs. Linda Osterkamp Desloge and Mrs. Lila Osterkamp Haberberger, in memory of their father, Dr. Roy W. Osterkamp, DE36. Preference will be given to a student pursuing a career in a medical field related to dental medicine.

Dr. Sidney F. and Dora K. Pakula Scholarship Fund. Established in 2001 by Dr. and Mrs. Lawrence C. Pakula in memory of Dr. Pakula's parents to support student scholarships.

William B. Parker Scholarship Fund. Established in 1976 by the School of Medicine in honor of William B. Parker's 51 years of service to the School.

William A. Peck, M.D. Scholars in Medicine. Established in 2002 to recognize Dr. Peck's 14 years of service to the Medical Center and Washington University community. University trustees, faculty, staff, alumni and friends honored Dr. Peck with gifts to this scholarship.

Phi Beta Pi — Charles Ruggieri Scholarship Fund. Established in 1985 by the Washington University

Alumni of the Phi Beta Pi medical fraternity to honor Charles Ruggieri and to assist deserving medical students enrolled in Washington University School of Medicine with the funding of their undergraduate medical education.

Philpott Family Scholarship Fund. Established in 1995 by the Philpott family to provide support for medical students with financial need and excellent academic achievement.

The George M. (M.D. '32) and George K. (M.D. '64) Powell Medical Student Scholarship Fund. Established in 1984 by Mrs. George M. Powell in grateful appreciation for the medical education provided to her husband and son by the Washington University School of Medicine, which so positively affected the lives of the Powell families.

Henry and Louise Reller Scholarship. To be given to medical students in the name of the parents of Louise Reller.

Lyman K. Richardson, M.D. Scholarship Fund. Established in 1993 by Mrs. Ellen Richardson to provide scholarship support to medical students.

Samuel Jennings Roberts Scholarship Fund. Created to provide scholarships for any students engaged in study leading to the degree of Doctor of Medicine.

Robert Allen Roblee Scholarship Fund. Established in 1948 through the gift of Mrs. Joseph H. Roblee for students in the School of Medicine.

Thomas W. and Elizabeth J. Rucker Scholarship Fund. Created in 1956 under the will of Eugenia I. Rucker, in memory of her mother and father.

J. Max Rukes Scholarship Fund. Established in 1987, the fund provides scholarship support to deserving medical school students who are doing research in endocrinology or the chemistry of metabolism.

Joseph H. Scharf Scholarship Fund. Provided in 1949 through the bequest of Dr. Joseph H. Scharf.

Robert G. and Maxine W. Scheibe Scholarship. Established in 1999 by Robert G. Scheibe, a 1960 Washington University graduate who also received his medical degree here in 1964 and his wife, Maxine, who is a 1966 graduate of the Washington University School of Nursing.

William H. and Ella M. Schewe Fund. Established to provide financial assistance to worthy students in the medical school.

Scholars in Medicine Program. Established in 1999 with gifts from individual donors to create scholarships to support medical students in the name of the donor.

School of Medicine Scholarship Fund. Created in 1970 to provide financial assistance for medical students.

Edna Schrick, M.D. Scholarship Fund. Established in 1992 by Dr. Schrick to provide scholarship support to female medical students.

Senior Merit Scholarship. Established by an anonymous alumnus of the School of Medicine, it provides a full-tuition scholarship to a senior student who has earned a distinguished record of academic and personal achievements during the first three years in the medical school.

Dr. John B. Shapleigh Scholarship Fund. Established in 1926 with the bequest of Dr. John B. Shapleigh and supplemented by contributions from Mrs. Shapleigh and Miss Margaret Shapleigh.

Alexander Balridge Shaw Scholarship Fund. Created in 1958 through the bequest of Roy A. Shaw in memory of his father, Dr. Alexander Balridge Shaw.

William T. Shearer and Lynn Des Prez Underrepresented Minorities Scholarship. Created by William T. Shearer, M.D. '70, and his wife, Lynn Des Prez. Scholarships are awarded to medical students from underrepresented minorities with preference given to African-American students.

Dr. Edward Hiroshi Shigeoka Scholarship Fund. Created in 1988 by Dorothy F. Shigeoka in memory of her husband, Dr. Edward Hiroshi Shigeoka, to help disadvantaged and deserving students pursue

their careers in medicine.

Ernie Simms Scholarship Fund. Founded in 1984 by friends, colleagues and former students of Professor Simms in recognition of his contributions to scholarly research and teaching in the Department of Microbiology and Immunology.

Stanley B. Smith, M.D., Scholarship Fund. Established in 2001 in memory of Samuel and Dora Smith, Dr. Smith's parents, to support student scholarships.

Southern Medical Association Student Scholarship. Awarded to a third-year student in recognition of outstanding academic achievements of a physician-in-training.

Beulah B. Strickling Scholarship Fund. Established in 1960 with a bequest from Mrs. Beulah B. Strickling.

Marleah Hammond Strominger Scholarship. Established in 1971 by the family and friends of Marleah Hammond Strominger. The recipient shall be a motivated student with need for financial assistance and shall come from a disadvantaged background.

Mary and Ernst Stuehrk Scholarship Fund. Established in 1987 to assist medical students with documented financial need.

Edwin H. and Virginia M. Terrill Scholarship Fund. Established in 1964 with the bequest of Dr. Edwin H. Terrill, an alumnus. It was Dr. Terrill's hope that scholarship recipients would repay into the fund the amount of the award.

Mildred Trotter Scholarship Fund. For students with documented financial need, the fund was established in 1979 by Dr. and Mrs. Paul Guttman, and supplemented by former students of Dr. Trotter, as a tribute to her many years of teaching in the Department of Anatomy.

Hiromu Tsuchiya Scholarship Fund. Created to provide scholarships in the School of Medicine.

Tuholske-Jonas-Tuholske Medical Scholarship Fund. Established in 1974 by Rose T. Jonas in memory of her father, husband and brother. The recipient shall be a senior student preparing to enter the field of surgery, obstetrics and gynecology, or internal medicine.

Dr. Cornelia M. Van Prooyen Scholarship Fund. Established in 1987, the fund provides scholarship support and other financial assistance to female medical students.

George S. and Aspasia N. Vellios Scholarship Fund. Established by Frank Vellios, M.D. '46, in honor of his parents. Scholarships are awarded to deserving medical students with financial need.

Louis H. Waltke and Marie Waltke Memorial Fund for Medical Education. Created in 1984 to provide scholarships and fellowships at the School of Medicine.

Dr. George S. Wilson Scholarship Fund. Established in 1988 with the bequest of Dr. George S. Wilson to provide scholarship support to medical students.

George and Irene Wolf Medical Scholarship Fund. Established by the donors to benefit students in the School of Medicine.

George Zografakis Memorial Scholarship Fund. Created by the family and friends of Dr. Zografakis, a distinguished faculty member in the Department of Surgery.

### **Loan Funds**

Auer-Rosenfeld Memorial Loan Fund. Established by Mrs. Elizabeth Auer to be used for educational loans to students.

Dr. John C. Boetto Loan Fund. Established in 1993 by a bequest from Mrs. Josephine D. Boetto as a memorial to her son to provide loans for deserving medical students.

Otto W. Brandhorst Loan Fund. Created in 1985 by the estate of Fern Crawford. This fund supports loans to students in the School of Medicine.

Dr. Harold A. Budke Loan. Established in 1998 to provide financial assistance to needy and deserving medical students.

Harold A. Budke, M.D., Loan Fund II. Established in 2001 with a bequest from the estate of Etta Elise Wedemeyer to provide loans to needy and deserving female students who will practice family medicine, internal medicine or obstetrics-gynecology medicine.

Class of 1947 Loan Fund. Established in 1996 by members of the class of 1947 in honor of their 50th reunion.

Jess K. Goldberg Memorial Loan Fund by Ophelia H. Kooden and Violet G. Sachs. Created in 1970 to provide zero-interest loans for medical students in memory of the donors' brother who passed away while attending medical school.

Health Professions Student Loan Fund. Established by federal legislation for medical students with a demonstrated financial need. Loans are available for long terms at favorable rates.

William Randolph Hearst Medical Scholars Loan Fund. In 1989, the Hearst Foundation provided funding for a new and innovative loan program which provides interest-free loans to students in their last year of study.

Ursula Hecker Loan Fund. Established in 1967 by a bequest from Ursula Lee Hecker for the use and benefit of worthy, deserving and needy medical students.

Kathy E. Holden Loan Fund. Established by Mrs. Roland Holden and the Roland and Ruby Holden Foundation in honor of her granddaughter, Kathy E. Holden, and in recognition of W. Edwin Dodson, M.D., to support loans to deserving medical students.

Horncrest Foundation — School of Medicine Loan Fund. In 1982, the trustees of the Horncrest Foundation approved a proposal on behalf of the School of Medicine to match up to a generous annual cap for five year loan funds solicited by the School. The campaign was extremely successful and now provides loan funds to students with documented financial need.

W. K. Kellogg Foundation Loan Fund. Provides financial assistance to medical students in need of such aid.

Gustel and Edith H. Kiewitt Scholarship Loan Fund. Provides loan funds for medical students.

Medical Scholars Loan Program. Established in 1985 by members of the William Greenleaf Eliot Society, this fund provides an interest-free source of long-term student loans. Annual contributions from alumni and friends support this perpetual and growing resource upon which current and future medical students will draw.

George W. Merck Memorial Loan Fund. Established in 1959 by The Merck Company Foundation, the original purpose of the loan was modified in 1983 to provide loans to graduating students which would help bridge the transition from student to resident physician.

Mound City Medical Forum Minority Student Emergency Loan Fund. Established in 1988 by the Mound City Medical Forum, a professional organization of black physicians in St. Louis and a component society of the National Medical Association, the fund provides short-term, no-interest loans for minority students.

Edward F. Musgrave Loan Fund. Established in 1981 by Mrs. Jeannette L. Musgrave. The fund supports medical student loans.

Goldie H. Penn and Lloyd L. Penn, M.D. Student Loan Fund. Dr. Penn, M.D. '33 established the fund in 1977 to aid well-qualified and deserving students.

Perkins Student Loan. A federal program (formerly National Direct Student Loan) to provide loans to students with financial need. Permits repayment over an extended period at a favorable interest rate.

Dr. William C. and Elva Pratt Loan Fund. Established in 1982 for medical students with demonstrated financial need.

G. H. Reinhardt Memorial Scholarship Loan Fund. Established in 1947 through the bequest of G. H.



Reinhardt.

Aline Rixman Loan Fund. Created in 1940 by William Rixman in memory of his wife, the fund is used to alleviate unexpected financial emergencies of medical students.

James L. and Dorothy Rouner Loan Fund. Established in 1997 by Dr. James and Mrs. Dorothy Rouner to be used for medical students pursuing a career in primary care–general internal medicine.

Caroline O. Schlesinger Loan Fund. Established in 1969 to provide financial support for medical students.

School of Medicine Student Loan Fund. Established to make loans to students with documented financial needs.

Washington University Medical Center Alumni Association Loan Fund. Provides emergency loans to medical students.

The Alan A. and Edith L. Wolff Loan Fund. Established in 1993 by Mrs. Edith L. Wolff to provide loans to students with demonstrated financial need who are in their final year of study for the Doctor of Medicine degree.

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## ***Committee on Academic Evaluation of Students***

### **Responsibility of the Committee**

Overall evaluation of academic performance by students at the Washington University School of Medicine will be made by the Committee on Academic Evaluation of Students (CAES). The deliberations of the CAES are generally positive in approach and are committed to the ultimate aim of assisting students to successfully complete the courses of study required by the School. The principle that careful selection of students will minimize attrition from the School is strongly endorsed by the CAES. The CAES has several important roles, including:

1. Approving promotion of students to a subsequent year of study;

2. Recommending to the Executive Faculty those students who have successfully completed all the prescribed requirements of the School and are qualified to receive the Doctor of Medicine degree;
3. Requiring entry of a student into an individualized program of study; and
4. Deciding upon matters of academic disciplinary action.

It is also the ultimate responsibility of the CAES to decide whether each student meets the academic and ethical standards necessary to enter the profession of medicine.

The rules governing operation of the CAES apply to students in the following categories:

1. Students who are engaged in the preclinical and clinical education requirements for the M.D. degree;
2. Students in a five-year M.A./M.D. degree program taking the pre-clinical or clinical portion of their M.D. education;
3. Students in the Medical Scientist Training Program (MSTP) taking the preclinical and clinical portion of their M.D. education; and
4. Those selected students with a prior medically relevant Ph.D. who have been approved by the Medical Science Training Placement Curriculum Committee (MSTPCC) and are enrolled in the M.D. portion of their education.

## **Membership of CAES**

**A)** Appointed and ex officio membership — There will be 12 voting faculty members of the CAES, and membership will be appointed for a four-year term by the Dean of the School of Medicine following nomination of suitable individuals by the department heads. Initial appointments will be staggered for periods of one-, two-, three- or four-year terms.

A faculty member may be reappointed to serve on CAES. Membership will be equally divided between clinical and preclinical departments. In addition, CAES membership will include, in ex officio capacity, the Registrar (non-voting) and the Associate Dean of Students (non-voting). The Associate Deans of Medical Student Education, Admissions, Diversity Programs and the Director of the Student Health Service may attend CAES meetings as non-voting observers.

**B)** Guests — A coursemaster who is not a member of the CAES but who has submitted a Fail/Incomplete grade for a student which is to be discussed at a meeting of the CAES will be present at the meeting to provide information concerning the student's performance. Alternatively, a coursemaster will send a designated representative. In the event that a coursemaster or designated representative is not present, final action for that student will be deferred until adequate information concerning the student's performance is available.

## **Chair of CAES**

A faculty member will be appointed by the Dean from within the CAES committee to serve as chair. The term of the chair will be four years.

## **Meeting Frequency**

CAES meetings must occur in a timely manner after final examinations or reexaminations (i.e., as soon as practical after grades are submitted to the Registrar). Generally grades will be submitted to the Registrar within 15 days of the completion of an examination or within four days of a reexamination. A meeting of the Committee also may be convened at any time such that timely review of student performance and action thereupon is provided.

## **Quorum for CAES Meetings**

Seven voting members must be present to consider items of academic disciplinary action (i.e., recommendation for dismissal from enrollment or entry into Individual Study Program).

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## ***The Evaluation and Grading System***

## General

**A)** Students are required to take all examinations at the specified time. A student may be excused from this rule for extenuating circumstances at the discretion of the coursemaster. Extenuating circumstances are defined as sudden personal illness, extreme family circumstance, or significant professional obligation. Doctor appointments of a routine nature or vacation time are not considered to be extenuating circumstances for which students can be exempted from the regularly scheduled exam date. Such occasions will be promptly reported to the Registrar. In the event of a student's inability to attend a scheduled examination due to sudden illness, extreme family circumstance, or significant professional obligation, the student is required to inform the coursemaster prior to the examination and to be evaluated by the Student Health Service. In the event that the student cannot reach the relevant coursemaster, the student should contact the Associate Dean for Student Affairs.

At his or her discretion, the Associate Dean for Medical Student Education may occasionally approve an exam date change for the entire class if the need arises but this is an exception, as the complete schedule is reviewed prior to the start of each academic year by coursemasters and student representatives.

**B)** In order to continue their studies at the Washington University School of Medicine, students must demonstrate sound judgment, responsibility, a sensitivity and compassion for individual needs, an ability to synthesize and apply knowledge and the capability of becoming a safe and effective physician. Breaches of these principles will be referred to the CAES for review.

**C)** At the annual CAES meeting, the Committee will vote to recommend promotion of students who have successfully completed all the requirements of the current academic year to the studies of the subsequent year.

**D)** At the conclusion of each academic year students receive a grade report which indicates the grade achieved in each course. When all the official grades have been received, the official transcript, in addition to listing courses and grades achieved, lists the grade distribution in each course (with the exception of selective and elective courses).

**E)** Prior to graduation, students are required to complete and pass all coursework. Occasionally students are permitted to complete equivalent coursework at other institutions with the permission of the responsible department and written notification to the Registrar.

**F)** It is the responsibility of students who feel that personal concerns, health problems, or any other factors may be adversely affecting their academic performance to bring such matters to the attention of the Director of the University Health Service or the Associate Dean of Student Affairs for possible accommodations.

## Grading System

### A) First Year

Courses in the first-year curriculum are evaluated on a Pass (P) or Fail (F) basis. For purposes of the official grade records of the School of Medicine, grades used for the first year are:

P = Pass, indicating satisfactory performance

F\* = Fail

E = Temporary grade, makeup of failed exam pending

I\*\* = Incomplete, temporary grade pending completion of course requirements, replaced with an F if not removed within 30 days

L = Successful audit

NG = Course credit earned, students not graded

W = Withdrawal from a course

Z = Unsuccessful audit

Failure of any examination which comprises a significant portion of the final grade (typically 20% or more) must be reported by the coursemaster to the Associate Dean for Student Affairs. In the event of a failure of a single exam within the course, the coursemaster may allow one attempt at remediation of this examination. The scheduling of a remedial examination will be agreed upon by the coursemaster and student but shall not extend beyond 30 days after the end of the course or academic year, whichever occurs first. Days of recess for Winter Break or Spring Break will not be

counted in the 30 days. A grade of "E" will be submitted by the coursemaster if the remedial examination is not accomplished within the course dates. This grade will stand on the academic record until it is replaced with a valid final grade of Pass or Fail. Grades of "E" that are not resolved within 30 days will be replaced with a grade of Fail (F). If the student successfully remediates the examination, and has otherwise passed the course, a Pass (P) will be recorded by the Registrar. A student may remediate only one examination in any course.

\*Any grade of F remains on the student's academic record. When the course is repeated or remediated the new grade will appear as a separate entry in addition to the failing grade.

\*\*Incomplete (I) indicates that, because of a delay excused by the coursemaster, the student has not completed the requirements to pass a course.

## **B) Second and Subsequent Years**

For purposes of the official grade records of the School of Medicine, the following grades are used for subsequent years:

H = Honors, reflecting a truly outstanding performance

HP = High Pass, awarded for excellent/very good work

P = Pass, indicating satisfactory performance

F\* = Fail

I\*\* = Incomplete, temporary grade pending completion of course requirements, replaced with an F if not removed within 30 days

Cr#/NCr# = Credit/No Credit for some second-year courses

L = Successful audit

NG = Course credit earned, students not graded

W = Withdrawal from a course

Z = Unsuccessful audit

\*Any grade of F remains on the student's academic record. When the course is repeated or remediated the new grade will appear as a separate entry in addition to the failing grade.

A failing grade will be recorded on the official educational record when a student fails the subject examination (defined as scoring at less than the 10th percentile as reported by the NBME) for the second time. A failing grade will be recorded when a student fails the clinical portion of the clinical clerkship or elective. In both events, the failing grade remains on the student's official educational record. When the course is remediated the new grade will also appear on the student's official educational record.

\*\*Incomplete (I) indicates that, because of a delay excused by the coursemaster, the student has not completed the requirements to pass a course.

## **C) Grade Reporting**

Final grades will be submitted to the Registrar by coursemasters within ten (10) working days of the final examination or final class meeting for the first two years. For third and fourth years, grades are due within ten (10) working days of the receipt of standardized examination scores or the last day of the rotation if no examination is given. A web-based University system, WEBSTAC, provides timely access to grades for the first two years. Grades and evaluations of student clinical performance are submitted on a standardized form and are available for review in the Office of Student Affairs throughout the academic year. Final grades for the clinical clerkships and electives are recorded in the University student information system at the end of the academic year and are subsequently available on WEBSTAC, which is updated quarterly. A paper copy of final grades is available upon request from the Registrar's Office.

## **D) Grade Point Average, Class Ranking and Grade Distributions**

The School of Medicine does not calculate grade point averages. Hours of credit appearing on the transcript reflect clock hours scheduled for the course or clinical rotation. For the purpose of residency applications only, students are placed in the upper, middle or lower third of the class according to a formula which considers weighting of courses and each academic year. This ranking is not recorded on the permanent academic record and therefore does not appear on transcripts. It may appear in the student's dean's letter. At the conclusion of the academic year, when all the official grades have been received, the official transcript, in addition to listing courses and grades achieved, gives the grade distribution in each course with the exception of elective and selective courses.

## **E) Grade Appeals**

A student who wishes to appeal his/her grade should file his/her request for review along with the basis for the appeal with the coursemaster within 30 days of the course completion. If reasons beyond the student's control delay the resolution of the appeal past the 30 day deadline, the Registrar must be notified so that the final transcripts, grade distributions and match rankings for the academic year can be held pending resolution of the matter. If this notice is not filed with the Registrar prior to the deadline, the grade cannot be accepted. Students participating in the residency match should also notify the office of career counseling that a grade appeal is in process.

**NO GRADE CHANGES ARE PERMITTED FOR THE ACADEMIC YEAR AFTER JULY 15.**

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## ***Actions for Academic Review***

### **General**

**A)** "Actions for Academic Review" refer to procedures used at the School in the event that a student fails a course or fails to complete a course in the requisite time.

**B)** In the event of any initial failure of a course offered at the School, the student will meet with the Associate Dean for Student Affairs to formulate a plan to remediate such failure.

**C)** If the Registrar has recorded a Fail or Incomplete grade in two or more courses in a single year or cumulatively three courses between years, the student's academic performance will be referred to CAES for review and determination of a course of action. Actions for Academic Review shall be referred to CAES for consideration by the Associate Dean for Student Affairs or Registrar's office.

**D)** Refer to The Individual Study Program (ISP) section for guidelines pertaining to students engaged in an ISP.

**E)** When the performance of a student is referred to CAES for potential academic review, the following rules will apply:

- 1) No student may take more than three years to complete the coursework required for the first two years. The end of such a "three year" period, is defined as 36 months from the date of matriculation to the School. Time periods included in a "Leave of Absence" are not counted in these 36 months.
- 2) In the absence of extenuating circumstances, no student may take more than two academic years to complete the coursework required in the first year curriculum.
- 3) The Associate Dean of Student Affairs shall notify the student of the course(s) for which Academic Review is proposed and the date and time at which the CAES will address the matter. The Associate Dean for Student Affairs, the Registrar, the coursemaster(s) or their designated representatives, shall present the matter to the CAES in a closed and confidential CAES meeting.
- 4) The student shall be permitted, upon written request, in advance of the CAES meeting, to appear on his or her own behalf. At the student's written request, he or she may be accompanied by a member of the faculty or staff of the School of Medicine for guidance and support. Alternatively, again following written request, the student may be accompanied by a fellow student enrolled in the School of Medicine.
- 5) A record of the CAES meeting shall be preserved for purposes of review by the School of Medicine's Appeals Committee, as necessary. The CAES's decision shall be by majority vote and shall be communicated, in writing, to the student by the Registrar's office.
- 6) For students referred for course failure, CAES meetings will have, in addition to the grade report forms for the course for which the student is referred to CAES, a complete record of the student's academic performance and the student file.
- 7) The maximum number of attempts to pass any individual course during enrollment in the School,

including time in an ISP, will be three.

8) Throughout the enrollment of a student it is within the jurisdiction of CAES to terminate the enrollment of a student who has demonstrated serious academic failure or breaches listed under The Evaluation and Grading System, section B. Such a course of action for serious academic failure will generally apply to a student for whom the Registrar has recorded Fail/Incomplete grades in three or more subjects.

#### **F) Cumulative Academic Review/Academic Warning**

Prior to promotion to the clinical year, the CAES will review the cumulative academic record of each student brought forth by the Associate Dean for Student Affairs to determine whether the student's academic performance justifies advancement to the clinical phase of the medical education without warning. Typically, three (3) remediated examinations and/or failing grades during the first two years of the curriculum would raise concerns about the student's fund of knowledge and readiness to participate in clinical care of patients. Students with overall records indicating such serious academic failure may be dismissed, may be required to repeat specific preclinical course work or may be advanced to the third year with academic warning.

Upon notification of advancement with academic warning into the clerkship year, the student must meet with the Associate Dean for Student Affairs

- 1) to review the planned clerkship schedule in order to consider schedule changes to facilitate successful clinical experiences;
- 2) to pursue available resources for academic intervention; and
- 3) to address any additional problems that may arise. It is recommended that these students seek tutorial assistance through each clerkship coursemaster.

A third-year student who has received an academic warning after the first two years and then fails any component of a clinical clerkship may be dismissed from the school.

#### **First Year**

**A)** If a student has received a Fail/Incomplete grade in a single first-year course, the Associate Dean for Student Affairs will meet with the student to formulate a plan from the following options:

- 1) take a re-examination in the course at a time prescribed by the coursemaster before August of the following academic year, OR
- 2) enroll in and successfully complete, at the level designated by the coursemaster, a summer course at a different institution, such course being completed and passed by the beginning of classes for the second year.

**B)** A student who, for a single course, fails the re-examination taken to remediate a failed course or fails to successfully complete an approved summer course will be referred for CAES to review and propose a recommended course of action. The CAES may require such a student to enter an ISP or may terminate enrollment. Alternatively the CAES may permit a re-examination. If this re-examination is failed enrollment will be terminated.

**C)** A student for whom the Registrar has recorded a Fail/Incomplete grade in two or more courses during the first year will be referred to CAES for determination of a course of action.

**D)** For students referred to CAES, under Actions for Academic Review, First-Year, section C (above), the Committee may decide to permit the student to take re-examinations, if a re-examination has not already been taken, in the courses for which Failed/Incomplete grades have been recorded. Such re-examinations will generally occur during the last week of the inter-academic year break. If such a re-examination is failed, the student may be required to enter an ISP or be dismissed from enrollment in the School.

**E)** The Associate Dean for Student Affairs may also request that the CAES review performance of a student who has demonstrated poor academic performance, either by demonstrating poor academic performance in two or more courses at interval evaluations conducted throughout the course, or by failing two or more examinations that are remediated within the course. In such instances the CAES may recommend a course of action.

If Fail/Incomplete grades have been recorded for two or more courses or a single re-examination, the CAES may require that a student enter an Individual Study Program or that enrollment in the School be terminated. If a student has failed three attempts to pass a course, enrollment will be terminated.

**F)** See "General-F."

## **Second Year**

**A)** Regarding courses of the second year, the Associate Dean for Student Affairs will meet with the students in the following categories regarding taking a re-examination, according to the schedule listed under the next section, labelled "B:"

- 1) a student for whom a Fail or Incomplete grade has been recorded in a single complete year-long course in the second year curriculum, OR
- 2) a student for whom a Fail or Incomplete grade has been recorded in one or two block-long courses.

**B)** Re-examinations in complete courses in Pathology or Clinical Medicine will generally be offered during the last week of the inter-academic year break, prior to entry into the third year. Re-examinations for students who have failed one or two block-long courses will be generally offered at a time determined by the coursemaster and the Associate Dean for Student Affairs. All re-examinations must be offered to students and completed by them prior to the start of the next academic year.

Students who fail a re-examination of a single course will be referred to the CAES to determine a course of action. The CAES may decide that the student must enter an ISP. Alternatively, a re-examination may be offered. If the re-examination is failed, enrollment will be terminated.

**C)** Students in the second year for whom the Registrar has recorded Fail/Incomplete grades under the following categories will be referred to CAES for review and resolution of a recommended course of action:

- 1) two year-long courses OR
- 2) three or more block-long courses OR
- 3) one complete year-long course and two block-long courses OR
- 4) a student for whom the Registrar has recorded a Fail/Incomplete grade in any re-examination.

**D)** At review by CAES for students referred to above (section C above), the Committee may decide to permit the student to take re-examinations, if a re-examination has not already been taken, in the courses for which Failed/Incomplete grades have been recorded. Such re-examinations will generally occur during the last week of the interacademic year break. The CAES may allow the student to defer beginning the clinical rotations so that re-examinations may be taken up to 12 weeks after the beginning of the usual cycle of clinical clerkships. Such extra time, used for study and preparation, will ordinarily mean that the student will not have the usual unscheduled time in the elective year. In the event that a Fail/Incomplete grade is recorded at a re-examination, CAES may require that a student enter an Individualized Study Program or that enrollment in the School of Medicine be terminated.

In the event that CAES decides not simply to permit re-examination, the CAES may require that the student enter an Individualized Study Program as detailed below, or that enrollment in the School be terminated.

**E)** The Associate Dean for Student Affairs may also request that the CAES review performance of a student who has demonstrated poor academic performance in two or more courses at interval evaluations conducted throughout the course when such performance has been reported to the Associate Dean. In such instances the CAES may recommend a course of action.

**F)** No student will be permitted to begin clinical rotations of the third year until all first- and second-year courses have been successfully completed.

**G)** See "General-F."

## **Third and Subsequent Years**

**A)** Regarding performances beyond the second year, the Associate Dean for Student Affairs will meet with a student for whom a single Fail/Incomplete grade has been entered regarding the requirements stipulated by the relevant coursemaster to remediate the grade entered. Options will generally include a re-examination or repeating all or a portion of the course. If a Fail/Incomplete grade has been entered following the prescribed remediation, the student will be referred to the CAES to determine a course of action. When such a student is referred to the CAES, the CAES may permit a re-examination or re-taking or repeating all or a portion of the course. If the course is failed a third time, enrollment in the School of Medicine will be terminated.

**B)** A student beyond the second year for whom the Registrar has recorded two or more failing grades in the clinical rotations or electives will be referred to CAES for review and proposal of a course of action.

**C)** Any student who fails to achieve a passing grade (defined as greater than or equal to 10th percentile as reported by the NBME) on any two or more subject (shelf) examinations conducted as part of the evaluation of clerkships will be referred to CAES for review and proposal for a course of action.

**D)** The Associate Dean for Student Affairs may also request that the CAES review performance of a student who has demonstrated poor academic performance in two or more courses at interval evaluations conducted throughout the course when such performance has been reported to the Associate Dean. In such instances the CAES may recommend a course of action.

**E)** For students referred to CAES, the Committee may endorse or amend the recommendations of coursemasters from whom Fail/Incomplete grades have been entered for students beyond the second-year curriculum regarding a necessary course of action to remediate the grades entered. In the event that a student fails such a course of remediation, as defined by the coursemaster and approved by the CAES, CAES may require that the rotation be repeated or that enrollment of a student in the School be terminated. Students will generally be permitted three attempts to achieve a passing grade in any clerkship course. If three failing examination grades or final clerkship grades have been submitted for a course, enrollment will be terminated.

**F)** A student who advances to the clinical years with academic warning and who fails any component of a clerkship will be referred to CAES for action including possible termination. See "General-F."

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## ***Individual Study Program***

The educational program is designed to assist the specialized needs of all medical students in an individualized and personalized manner. Tutorial assistance is available to any student at any time as detailed below. Occasionally students who have difficulty in handling the normal academic course load will be required to enter an Individualized Study Program (ISP), requiring five years to complete rather than four years.

The following rules govern students engaged in an ISP:

**A)** Recommendation requiring entry into an ISP is made by the CAES after careful consideration of the student's academic performance at intervals throughout the curriculum.

**B)** The intent of an ISP is to optimize the prospect that the student will successfully complete the curriculum.

**C)** The specific program of any ISP (i.e. the content and sequences of courses) will be determined by the student and the Associate Dean for Student Affairs with input from relevant coursemasters and the CAES. The specific recommendations of the CAES will generally be adopted. The CAES may delineate for the student required to enter an ISP the consequences of a Fail/Incomplete grade recorded in any course once the student has entered the ISP. The plan for execution of an ISP, once established, will be recorded in the student's file in the Registrar's office and a copy provided to the student.

**D)** Unless extenuating circumstances exist, ISP students are required to take the examinations for a particular course in their usual temporal relationship to the coursework. Requests for consideration of unusual circumstances should be recorded in the student's file in the Registrar's office.

**E)** In the event that a Fail or Incomplete grade is recorded for a student after entry into an ISP, a re-examination schedule will be determined by CAES. If a Fail/Incomplete grade is recorded for the re-examination of a single course for which two previous final examinations have been failed, enrollment in the School of Medicine will be terminated. If a Fail or Incomplete is recorded for the re-examination of a single course which the student has not previously failed, the student may be permitted to repeat the course.



**F)** At the completion of the time for their ISP, ISP students who have not successfully completed and received a grade of Pass or above in the usual courses of the first- and second-year curricula by the start of the second six-week period in the year of the clinical clerkship will be dismissed from enrollment in the School.

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## ***Tutorial Assistance Program***

Students experiencing difficulty in any course may request tutorial assistance. Such requests should initially be directed towards the coursemasters and thereafter to the Associate Dean for Student Affairs. Students who are repeating courses will be offered the opportunity for tutorial assistance. CAES may also require that a student seek tutorial assistance.

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## ***Leave of Absence***

**A)** A student may request a leave of absence for academic or personal reasons by submitting a statement in writing to the Office of Student Affairs. Such a statement should include indication of the beginning and anticipated ending dates and a brief statement of the reason (academic or personal). Requests for leave of absence must be approved by the Associate Dean for Student Affairs. Leaves of absence shall be granted for no more than one year, but in unusual cases may be renewed by CAES for additional years after discussion with the Associate Dean for Student Affairs. Students requiring a personal leave of absence for medical reasons must submit a supporting letter from the Director of the Student Health Service.

**B)** In extreme cases where a student may pose a danger to others, an involuntary leave of absence may be imposed. In such a matter the following procedure applies:

1) The Chancellor or his designate may impose an involuntary leave of absence when there is evidence that a student has committed an offense under these rules or the University's Judicial Code and there is evidence that the continued presence of the student on the University campus or as a participant in a clinical rotation poses a substantial threat to himself or herself, to patients or to the rights of others to continue their normal University function and activities.

2) Imposition of the involuntary leave of absence may result in denial of access to the campus, prohibition of class attendance and/or prohibition of participation in clinical rotations.

3) If an involuntary leave of absence is imposed, the suspending authority shall prepare a written notice of the imposition and shall have the notice mailed certified or personally presented to the student. The written notice shall include a brief statement of the reasons therefor, and a brief statement of the procedures provided for resolving cases of involuntary leave of absence under these rules.

4) The student shall be given an opportunity to appear personally before the suspending authority within five (5) business days from the date of service of the notice of imposition of the involuntary leave of absence. If the student asks to appear personally before the suspending authority, only the following issues shall be considered:

a. Whether the suspending authority's information concerning the student's conduct is reliable; and  
b. Whether under all the circumstances, there is a reasonable basis for believing that the continued presence of the student on campus or in clinical rotations poses a substantial threat to the student, to patients or to the rights of others to engage in their normal University functions and activities.

5) Within one week of the date of imposition of the involuntary leave of absence, the suspending authority shall either file a statement of charges against the student with the University Judicial Board, and shall have the statement or charges served, by mail or personal service, upon the student and the dean of the school or college or director of the program in which the student is enrolled or initiate proceedings under these rules to convene a Disciplinary Committee.

6) A temporary suspension shall end when  
(i) rescinded by the suspending authority, or  
(ii) upon the failure of the suspending authority to promptly file a statement of charges with the University Judicial Board or a Disciplinary Committee, or (iii) when the case is heard and decided by the University Judicial Board, or the Disciplinary Committee.

Return of students from involuntary leave of absence requires clearance of both the Director of the Student Health Service and the Associate Dean for Student Affairs.

**C)** Students receiving financial aid should be advised that at the end of sixty (60) days or more leave of absence, the grace period for loan repayment during a leave of absence may be exhausted. In such cases there will be an obligation for the student to start payments. According to the Federal rules under which loans are made, the use of a grace period during a leave of absence will generally mean that the schedule for loan repayment may be changed. Students who are receiving financial assistance should consult with the Financial Aid Office to determine the implications of a Leave of Absence for their financial aid.

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## ***Policy on Student Status and Benefits During Research Years or Leave of Absence***

### **M.D./Ph.D.**

Student status is maintained while in the research phase of the M.D./Ph.D. program. Students are registered in the graduate school during the research years. Both student health and disability coverage are provided by the Division of Biology and Biomedical Sciences.

### **M.A./M.D.**

Student status is maintained while in the research phase of the M.A./M.D. program. Students are registered in the graduate school during the research year. Both student health and disability coverage are provided.

### **Five-Year M.D. Program**

Research Year Here: Student status is maintained throughout the approved research year. In exceptional circumstances, a second research year may be permitted. The student may receive a stipend, but may not be considered an employee of the university. Students are registered in the School of Medicine. Both disability and student health coverage are required and are payable by the student. Outside funding often covers such fees.

Research Year Away: Student status is maintained throughout the approved research year. Students are registered in the School of Medicine. Both disability and student health coverage are optional with proof of like coverage. The cost of either elected coverage is payable by the student. Outside funding often allows these costs.

### **Leave of Absence**

Leave of Absence Year Here: Student status is not maintained during the leave of absence though benefits of student health coverage and disability insurance are optional throughout an approved leave. Costs are payable by the M.D. program students. M.D./M.A. and M.D./Ph.D. students may request support for these costs from the Division of Biology and Biomedical Sciences if funds are available. The Office of Financial Aid should be consulted for information regarding loan repayment and grace periods when on a leave of absence.

Leave of Absence Year Away: Same as Leave of Absence Year Here.

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## ***Appeals Process***

The School of Medicine has the right and responsibility to assure that each student, during the time of enrollment, demonstrates levels of academic achievement and ethical stature appropriate to the practice of medicine. The School must also ensure provision of fairness in discharging those rights and responsibilities.

An Appeals Committee, composed of faculty members appointed by the Dean of the School of Medicine, shall be created to review decisions under Academic Review. A quorum of this committee shall consist of five (5) members.

Within twenty (20) days of the date on which an Academic Disciplinary Action decision is rendered by CAES, the student may request, in writing to the Registrar, that the School of Medicine's Appeals Committee review the record of such CAES decision or that the Appeals Committee request that the CAES consider additional information which was not previously presented to CAES. The letter to the Registrar should include the basis for the appeal as well as any new information of relevance.

The Appeals Committee shall review the record of the CAES decision solely to determine whether the pertinent CAES procedures were followed and whether all relevant information was considered by the CAES. If the appeal is based on a contention that all relevant information was not presented to CAES, the appeal must provide the Appeals Committee with adequate reason why the student did not present this information at the CAES meeting in question.

On all appeals the Appeals Committee may either remand the matter to the CAES for reconsideration with its explanation for the remand, or deny the appeal. However, the Appeals Committee shall not substitute its opinions of the merit of matter and appeal for those of CAES. The Appeals Committee shall provide its decision in writing to the Dean, the student, the CAES, the Associate Dean for Student Affairs and the Registrar. The Appeals Committee shall determine whether the student may continue his or her curriculum pending its review of a CAES decision.

Within twenty (20) days of the date of an Appeals Committee's decision or referral back to CAES, the student may request, in writing, that the Dean of the School of Medicine review the decision of the Appeals Committee. The decision of the Dean shall be final.

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## ***Research Integrity Policy***

Allegations of breach of research integrity policy are the primary responsibility of the Research Integrity Committee of the School of Medicine. Complaints regarding students enrolled for the M.D. degree will be directed promptly to that committee. The Research Integrity Committee will promptly investigate the charges and report its conclusions and recommendations to the Dean, who will convene a Disciplinary Committee.

For further information, refer to the policy's web site: [www.wustl.edu/policies/research.html](http://www.wustl.edu/policies/research.html)

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## ***Procedures Concerning Breaches of Professional Integrity***

Matters involving possible breaches of professional integrity shall be brought to the attention of the Associate Dean for Student Affairs. Behavior inappropriate to the medical profession shall mean breaches of personal confidence and trust including cheating or unauthorized use of materials during examinations; abuse, misrepresentations or other seriously improper conduct in relation to patients or colleagues including breaches of confidentiality; and other misconduct, misrepresentation or failure in personal actions or in meeting obligations, so as to raise serious unresolved doubts about the integrity of the student to enter the practice of medicine. In such matters, the following rules apply:

**A)** The individual(s) raising the questions of possible misconduct shall present them in writing to the Associate Dean for Student Affairs and shall be reminded of their confidentiality.

**B)** The Associate Dean for Student Affairs shall convene a meeting with the Associate Dean for Admissions or the Associate Dean for Medical Student Education to review the complaint and decide whether further action is necessary.

**C)** If further inquiry is deemed necessary, the Associate Dean for Student Affairs and one of the Associate Deans listed under section B will discuss the complaint with the student.

**D)** If the Associate Dean for Student Affairs considers the matter sufficiently serious, a recommendation will be made to the Dean to convene a Disciplinary Committee.

**E)** Appointment to a Disciplinary Committee will be made by the Dean and will include five voting faculty members and one nonvoting academic representative from the Office of Student Affairs. Appointees will decline if assurances of their impartiality in the matter are not evident. The Dean will appoint a chairperson who will be responsible for applying correct procedure to the hearing. The Registrar will attend the meeting to record the minutes. A simple majority will prevail (3 out of 5 votes), except when the motion is for recommending to the Dean dismissal from enrollment in the School, where 4 out of 5 votes will be required. The recommendation of the Disciplinary Committee will be forwarded to the Dean, who will decide upon the disciplinary action to be taken.

**F)** If the Disciplinary Committee is convened, the Associate Dean for Student Affairs will forward all information concerning the matter to the Committee.

**G)** The Disciplinary Committee shall, whenever possible, convene within one to two weeks after the initial meeting between the student and the Associate Dean for Student Affairs.

**H)** Prior to the meeting of the Disciplinary Committee, the Associate Dean for Student Affairs will inform the student in writing regarding the time, date and place of the meeting, that the proceedings are completely confidential, and that the student may bring a faculty member, staff member or fellow student of the School of Medicine for guidance and support. A copy of the complaint will be provided to the student.

**I)** The following guidelines will be applied to the conduct of a Disciplinary Committee and these will be made available to members of the committee at the opening of the meeting. The aim of the Committee is to provide fair and prompt review of the inquiry. The Committee is not positioned in an adversarial role against the student but simply to review the evidence as presented and determine its decision regarding disciplinary action. The Committee has neither the advantages nor limitations inherent in a court of law. Innocence of the student being questioned will be presumed. No facts or conclusions will be assumed. The decision as to whether the student perpetrated the alleged act will be made solely on the basis of evidence and testimony presented at the meeting. During the hearing the student will have access to all the evidence presented. The record of such proceedings will be held confidentially with access restricted to Committee members, the student involved, and members of the Administration involved in the proceedings.

**J)** All who appear before the Committee are assured that their appearance occurs without fear of repercussions from their testimony.

**K)** After the meeting and decision of the Disciplinary Committee, the Associate Dean for Student Affairs will inform the student verbally and in writing of the result within three working days.

**L)** The student will have access to the written record of the meeting's proceedings.

**M)** Unless it is determined by the Associate Dean for Student Affairs that extraordinary circumstances exist (e.g. physical threat to others), the student will be permitted to continue in the usual academic activities during the Disciplinary proceedings.

**N)** In the event that the student wishes to appeal the decision of the Dean dismissing the student from enrollment in the School, such an appeal should be directed to the Judicial Administrator of the University according to the University Judicial Code. The decision of the Judicial Administrator shall be final.

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## ***Liability Insurance***

Washington University provides general liability insurance for all students or practicums while participating in required clinical experiences. In addition, Washington University voluntarily provides a defense and indemnification benefit for matriculated students who are candidates for the M.D. degree at the School of Medicine (WUSM).

The benefit is provided to WUSM students for defense and indemnification of claims arising out of activities which are part of academic programs and only while a student is acting in his or her capacity as a medical student enrolled in the undergraduate medical program at the School of Medicine. This policy is subject to terms, conditions, limitations and exclusions, and each request for defense/indemnification will be decided on a case-by-case basis at the sole discretion of the University.

Defense/indemnification will not be provided for any criminal act or any act committed while in violation of any law or ordinance or University program guideline, or where the injury or damage resulted from intentional wrongdoing, gross negligence or recklessness, or in the event that the action or proceeding is brought by or on behalf of Washington University. This indemnification does not cover any liability which is insured elsewhere, but it may be in excess of any amount payable under any other such insurance.

Any incident, either actual or alleged involving patient injury which could lead to a claim, which you have knowledge of must be reported immediately to the Risk Management Office of the School of Medicine, 362-6956.

If you have any questions about Washington University's professional liability program, please feel free to call the Risk Management Office.

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## ***United States Medical Licensing Exam (USMLE)***

The USMLE is designed to "assess a physician's ability to apply knowledge, concepts, and principles, and to demonstrate fundamental patient-centered skills, that are important in health and disease and that constitute the basis of safe and effective patient care." The USMLE represents a single uniform examination for medical licensure in the United States, and as such, is a minimum requirement for obtaining a medical license.

The USMLE consists of four separate examinations. "Step 1 assesses whether you understand and can apply important concepts of the sciences basic to the practice of medicine, with special emphasis on principles and mechanisms underlying health, disease, and modes of therapy. Step 1 ensures mastery of not only the sciences that provide a foundation for the safe and competent practice of medicine in the present, but also the scientific principles required for maintenance of competence through lifelong learning." Step 1 is taken after completing the second year at WUSM.

Step 2 consists of two separate examinations, Step 2 CK (Clinical Knowledge) and Step 2 CS (Clinical Skills) which are taken at different times. "Step 2 assesses whether you can apply medical knowledge, skills, and understanding of clinical science essential for the provision of patient care under supervision and includes emphasis on health promotion and disease prevention. Step 2 ensures that due attention is devoted to principles of clinical sciences and basic patient-centered skills that provide the foundation for the safe and competent practice of medicine." Step 2 exams are taken after completing the third year but prior to graduation from WUSM.

"Step 3 assesses whether you can apply medical knowledge and understanding of biomedical and clinical science essential for the unsupervised practice of medicine, with emphasis on patient management in ambulatory settings. Step 3 provides a final assessment of physicians assuming independent responsibility for delivering general medical care." Step 3 is taken following graduation and during internship/residency training.

Further information can be obtained from the USMLE Bulletin of Information published by the National Board of Medical Examiners, and is available, along with application forms and information, at: <http://www.usmle.org>

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## ***St. Louis***

St. Louis is one of the most livable areas in the United States, with a cost of living that ranks consistently lower than many other comparable cities. For recreation, the lively arts, and great everyday living, St. Louis is a city of opportunity and variety.

The Gateway Arch — St. Louis' preeminent symbol — represents the joining of old and new on the historic Mississippi riverfront. Rising in front of a dramatic skyline, the Arch symbolizes St. Louis' role as the Gateway to the West. Today, as in the past, St. Louis is a prominent cultural and commercial city, linking the north and south, east and west, through its traditions and its view of the future. The Arch itself, designed by Eero Saarinen, is a remarkable sculptural achievement and an incredible engineering feat, worthy of its dramatic setting. It frames the commercial center of downtown and the Old Courthouse, where in 1847 Dred Scott argued his right to be a free man.

Ambitious renovation and architectural experimentation characterize busy downtown St. Louis. The Old Post Office and the massive Romanesque Union Station have been revitalized. Union Station houses a hotel and expansive shopping mall, inviting convention visitors and tourists to explore commerce St. Louis-style. New corporate headquarters buildings downtown display the variety of modern architecture evident in major metropolitan centers around the nation. Members of the Washington University School of Architecture consult with local firms in the creation of new structures and the refurbishing of the old. A housing area in the fashionable Central West End, home to the Washington University Medical Center, is the design of a School of Architecture professor.

Though the St. Louis area has nearly 2.5 million residents, living here is simple and affordable. A convenient, modern highway system and a simple city plan allow easy access to all parts of the city and its many activities. A light rail line — MetroLink — runs from Lambert Airport through Laclede's Landing in the downtown area and on to Illinois. A stop at the medical center makes this mode of transportation especially convenient for medical school faculty, students and staff.

A keynote to St. Louis is variety. Any taste in housing, cuisine, lifestyle and leisure activities can be found in the greater St. Louis area, but St. Louis is less expensive than comparable cities. Attractive, affordable residential communities abound here, many of them within a two-mile radius of Washington

University. The Central West End, University City and Clayton — all of which border Washington University — provide attractive housing and recreational opportunities. To the north, small shops, galleries and ethnic restaurants dot the main street of University City. Adjacent to the Washington University Medical Center and close to the Hilltop Campus is the Central West End — fashionable, trendy and restored to its late-19th century grandeur. To the west are the elegant homes and multifamily dwellings of Clayton. Those who come to St. Louis to be associated with the University find apartments that range in price from \$450-\$650 per month, and purchase properties ranging from \$90,000 and up, all in the immediate area. For those who desire a more suburban lifestyle, west St. Louis County is a growing and beautiful area.

## **Cultural Opportunities**

Once settled, new St. Louisans discover the rich recreational and cultural life here. The effects of the St. Louis renaissance are easily seen in its theaters, galleries and festivals. The Saint Louis Symphony, among the finest in the nation, performs at historic Powell Hall. Symphony members bring their skills to the community through teaching and chamber concerts as well. Several hold appointments in the Washington University music department, which also has close ties with the St. Louis Conservatory and Schools for the Arts (CASA), an institution offering high-level, intense training in music and the arts. In the downtown area, the rich St. Louis traditions in jazz, blues and ragtime music are continued in a number of lounges and clubs.

The Opera Theatre of St. Louis has been enormously successful, nationally and internationally, bringing English-language versions of the classics and presentation of contemporary operas to the stage. The Repertory Theatre of St. Louis has an extensive annual season, which includes experimental works and traditional dramas. The Stages St. Louis Theatre Co.; Kirkwood Theatre Guild; West End Players Guild; Act., Inc.; Historyonics Theatre Co.; and the Saint Louis Black Repertory Company enrich the dramatic offerings available in the immediate area. On campus, Edison Theatre offers the very highest quality in national and international programs in theater, dance and music each season.

Broadway comes to St. Louis at the Fox Theatre, a \$2 million renovation of a 1929 example of exotic cinema temple art. Galleries sprinkled throughout the area bring the most current in visual arts to St. Louis, while antique shops remind us of the past. St. Louisans tend to be avid moviegoers. Supplementing the standard movie fare available throughout the metropolitan area are two theaters close to campus, the Hi-Pointe and the Tivoli, both offering excellent foreign films. The St. Louis International Film Festival takes place every fall.

When the St. Louis Art Museum was built for the 1904 World's Fair, much of the Washington University collection was housed in it. Standing on a hill in Forest Park, the museum was called the jewel of the Fair. By 1929, it exhibited the entire University art collection and provided space for fine arts students and faculty shows. Though in 1960 Washington University built its own museum — the Gallery of Art housed in Steinberg Hall — and moved its collection there, ties with the St. Louis Art Museum remain very close. Students in art and in business intern at the Art Museum, working in arts management and gallery organization.

St. Louis also features Laumeier Sculpture Park, which displays 60 large-scale sculptures representing artists of international renown. St. Louis has two major historical museums as well: the Missouri Historical Society in Forest Park and the Museum of Westward Expansion under the Gateway Arch.

## **Recreation**

For recreation, St. Louisans may use any of 93 parks that dot the metropolitan area. In Forest Park, which lies between the two Washington University campuses, are the Art Museum, The Muny (an outdoor theater), the famed St. Louis Zoo, municipal golf courses, tennis and handball courts, a skating rink, and acres of paths, picnic areas, gardens and wooded groves. Tower Grove Park is in south St. Louis, and adjoining it is the Missouri Botanical Garden, world famous for its research, collections and facilities. The Garden's professional staff members hold positions on the Washington University faculty and make the extensive research facilities available to students.

Farther afield, St. Louis residents find outdoor adventure in the countryside beyond the city. In the Ozark Mountains, on the rivers of Missouri, on the lakes of neighboring Illinois, variety abounds. Camping, hiking, floating, rock climbing and caving are among the many possibilities within a few hours' drive of St. Louis. For sailors, there is Carlyle Lake in Illinois. And for those with rod and reel, the Missouri streams are made to order.

The Washington University Athletic Complex provides outstanding resources to athletes at every level of ability. Open to all members of the University community, it includes an eight-lane, 25-meter stretch pool, two complete gymnasiums, weight rooms, racquetball courts, a complete outdoor tennis complex and a track complex. Built on the site of the 1904 Olympic games, this state-of-the-art facility offers recreational opportunities year-round for students, faculty and staff.

For the spectator, St. Louis is a splendid sports town. For more than a century, it has hosted one of the oldest traditions in baseball — the St. Louis Cardinals. Dizzy Dean and the Gas House Gang, Stan Musial, Lou Brock, Ozzie Smith and Mark McGwire are all part of Cardinal history.

St. Louis' NFL Rams brought home the Superbowl trophy in 2000, after being welcomed to the community in the fall of 1995. The St. Louis Blues ice hockey team moved here in 1967 and enjoy a winning history. St. Louis also supports a number of semi-pro sports teams.

## **Employment**

St. Louis is a great place to work; job opportunities are varied and abundant. Many companies are distinguished for their excellent working conditions, and commuting is easier than in many large cities.

Many major corporations are located here, as are a variety of retail, transportation and banking organizations. Among the top firms in town are Anheuser-Busch, Emerson, Boeing and May Department Stores. Many support services have grown up around these corporations — including law, accounting, data processing, advertising, public relations and design firms, as well as photographic and audio-visual studios.

One of the largest employers is the Washington University Medical Center — made up of the School of Medicine and several teaching hospitals. Illustrative of the productive ties between University and community, Pfizer supports the Mentors in Medicine Program, which trains residents to do clinical research, and the Young Scientist Program, a student-run initiative that brings inner-city high school students into research laboratories.

The John M. Olin School of Business at Washington University enjoys a rich and varied partnership with the business community. As a laboratory for internship opportunities, entrepreneurship study, and student practicums offered through Olin's Center for Experiential Learning, St. Louis plays an integral role in the education of undergraduate and graduate business students. In turn, Olin creates value for area businesses by matching top Olin talent with pivotal positions in their firms. Moreover, Olin delivers Executive MBA and leadership development programs to help individuals and organizations succeed. Olin faculty teach in these programs and consult with area corporations desiring to explore new opportunities for growth and development.

The local business and professional communities also have been very supportive of a new graduate internship program, making part-time jobs available to advanced graduate students in the humanities and social sciences divisions of the Graduate School of Arts and Sciences.

Similarly, the School of Law has close ties with the St. Louis legal community and, through its clinical program, offers internships in private and local government offices and in state and federal courts. In addition, the law school is fortunate in the active and interested role of the local bar associations in the development of the school's special programs.

The George Warren Brown School of Social Work also is linked in many ways to the St. Louis social work community. Students find practicum assignments throughout the area, and both students and faculty do research and consult with local agencies.

A strong partnership exists between technologically based businesses and industries in St. Louis and the School of Engineering & Applied Science. Engineering faculty members regularly undertake collaborative research and consulting projects with area firms such as Boeing, Monsanto and Emerson. At the undergraduate level, the cooperative education program gives engineering students an opportunity to apply what they learn in the classroom in alternating periods of employment, both in St. Louis and nationwide. A unique program offered in conjunction with the University of Missouri-St. Louis is designed to allow nontraditional students from St. Louis to earn undergraduate degrees in civil, electrical, and mechanical engineering. The Henry Edwin Sever Graduate School of Engineering & Applied Science offers programs of instruction and research leading to specialized master's degrees and to the Doctor of Science degree. Most of the graduate programs offered may be pursued by both full-time and part-time students. Numerous locally employed engineers, scientists, and technical managers have earned master's degrees through part-time study, or have completed significant



portions of the requirements for their Doctor of Science degrees while they were part-time students. There is a network of more than 80 faculty members associated with Department of Biomedical Engineering, representing numerous divisions of the University, including many from the School of Medicine. This network provides innumerable opportunities for collaborative research and research training in a diverse array of biomedical engineering activities.

In addition to their ties to local business, both the Hilltop Campus and the School of Medicine at Washington University are dedicated to the support of K-12 education. Students from the medical school participate in a variety of outreach programs, including Students Teaching AIDS to Students (STATS), designed to teach awareness and responsible behavior to junior high school students; the Young Scientist Program, an interactive learning experience that brings high school students to the Medical Center; and health and preventive programs on drug and sex education.

In short, Washington University enjoys a special relationship with St. Louis.

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## ***Housing***

Those who come to St. Louis to be associated with the Washington University School of Medicine find apartments which range in price from \$450-\$650 per month, all in the immediate area. The Apartment and Housing Referral Services, located in Millbrook Square on the Hilltop Campus, maintains listings of housing appropriate for married and single students. For information, contact Apartment and Referral Services at Campus Box 1059, 6926 Millbrook Blvd., St. Louis, MO 63130 or (314) 935-5092.

The Spencer T. Olin Residence Hall, (314) 362-3230, located at 4550 Scott Ave. in the Medical Center, has accommodations for approximately 200 single men and women. The building was made possible by generous gifts from Spencer T. Olin, alumni and friends of the School of Medicine. Olin Hall is planned for the convenience of students in the medical or paramedical sciences, and includes shared cooking facilities, a gymnasium, weight room, laundry room and penthouse with a recreational area and large-screen television with satellite system. Every effort is made to provide an atmosphere that not only aids residents in meeting their study obligations, but also recognizes their privileges as graduate students.

The rates for rooms during 2004-2005 are:

Summer 2004 (May 22nd - August 1st)

Single Room:	\$925
Large Single:	\$1,140
Solo Suite:	\$1,345
Double Room:	\$630*
Double Suite:	\$925*

School Year: Mid August-Mid May (Nine Months)

Single Room:	\$3,100
Large Single:	\$3,715
Solo Suite:	\$4,390
Double Room:	\$2,080*
Double Suite:	\$3,100*

\*Price per student

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## ***Security***

Security at the School of Medicine is the responsibility of Protective Services. Uniformed Protective Services Response Officers are on duty 24 hours a day, seven days a week to provide for personal safety, reduce the opportunity for crime, apprehend law violators, provide crime prevention and

awareness training and assist in enforcement of University rules and regulations. Armed and unarmed Protective Services personnel are radio-dispatched. They respond immediately to telephone calls made to 362-HELP (4357). Officers patrol the campus on foot, on bicycles and in marked mobile units. Contract Agency guards supplement the in-house staff.

The Medical School access control program makes the campus easily accessible after hours and on weekends. Faculty, staff and students are issued a photo identification badge that identifies the wearer as a member of the medical school community. The badge has a magnetic strip that activates the computerized door lock entrances to the School's buildings. These entrances have two-way intercoms for direct communication with Protective Services' radio dispatcher, as do direct-ring telephones located outside selected campus buildings and "Code Blue" emergency telephones on surface parking lots and in the garages.

Each year Protective Services publishes a summary of statistical information concerning campus crime as required by federal law, on the medical school web page at <http://medschool.wustl.edu/~fmd/proserv.htm>. Information may be found on the web pages under "Our Students" or "Our Staff" under the heading "Resources and Information." A daily crime log, information on crime prevention tips and the many services and programs provided by Protective Services also appear on the web. For a printed copy of the annual security report, contact Washington University School of Medicine, Protective Services Department, Campus Box 8207, 660 S. Euclid Ave., St. Louis, MO 63110, or by calling (314) 362-4814.

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## ***Parking***

Parking is available on various surface lots and garages owned by the School of Medicine. The surface lots are located near a variety of sites within the Medical Center. Although surface parking space is limited, parking is generally available in the 1,500-space WUSM employee/student garage located at the corner of Clayton and Taylor avenues. Shuttle service is available for transportation from one site to another in accordance with specific shuttle schedules. If additional information is needed, please contact Transportation Services at (314) 362-6824. If you are interested in carpooling, vanpooling, or Bi-State Transit passes please contact our Rideshare Office at (314) 747-0706.

For additional information regarding shuttle routes and times, please see the following web site:

<http://transportation.wustl.edu>

Gold Line: Medical School, Lewis Center, Northwest Loop/North by Northwest

Red Line: West Campus, Galleria, Wohl Center

Green Line: Lewis Center, University City Loop

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## ***Check Cashing***

Personal checks may be cashed at the Cashier's Office (Room 107, first floor McDonnell Sciences Building). Hours are 9 a.m. to 4 p.m., Monday through Friday. Limit for personal checks is \$100 per check or a total of \$100 per day. A charge of 25 cents per check is made for this service. Limit for Washington University checks is \$200 per day. Your Washington University identification card must be presented when checks are cashed.

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## ***Bulletin Boards***

Bulletin boards are located on the wall outside the Admissions Office, on the first and second floors of the McDonnell Sciences Building, on the first floor of Olin Residence Hall, and in the lounge on the

ground floor of the Bernard Becker Medical Library. Please check these frequently.

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## ***Lockers***

Student lockers with combination padlocks are located on the second floor of McDonnell Sciences Building. Locker assignments are made by the Registrar's Office for a nominal fee to cover the cost of the padlock. Only padlocks issued by the Registrar's Office may be used.

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## ***Mail***

First-class student mail sent to the School of Medicine will be put in student mailboxes. This will most probably serve as a temporary mailing address and be used only until students are settled in St. Louis. It is important that mail addressed and sent to the School of Medicine include both student status (WUMS = Washington University Medical Student) and year, as follows:

Jane Doe, WUMS I  
Washington University School of Medicine  
Campus Box 8077  
660 S. Euclid Ave.  
St. Louis, MO 63110-1093

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## ***Student Health Service***

Student Health Service	
Director:	Dr. Karen S. Winters
Information/Appointments:	(314) 362-3523
Billing/Benefits:	(314) 362-2346

For a complete description of benefits please visit the website [WUSMHEALTH.wustl.edu](http://WUSMHEALTH.wustl.edu).

The Student Health Service provides a complete service for full-time students registered in the School of Medicine. Services are provided through a self-funded program included in tuition costs. Services include professional care by staff physicians: Internists, Allergists, Dermatologists and Counselors, with referrals to other consultants. Services are available by appointment on-site at 4525 Scott Ave, Suite 3420, Monday – Friday from 8:00am – 4:00pm. The Health Service has implemented an after hour coverage monitored by Dr. Winters. The students are able to call 362-3526 after hours for non-urgent care. All medications, diagnostic tests, x-rays and consultations ordered by the physicians are covered 100% with a small co-payment, in the absence of private insurance. In addition, the Health Service offers full major medical benefits including labor and delivery. Care for urgent illness, emergency care is available at the Emergency department of Barnes-Jewish Hospital.

There is a maximum lifetime benefit per student of \$1,000,000. The student or his/her family is responsible for meeting the costs of hospital care in excess of those paid by the Student Health Service. There are no benefits for outpatient care or medication away from the Medical Center. The responsibility of the Student Health Service for hospitalization and emergency care will end 30 days after an individual ceases to be an officially enrolled student. The School of Medicine also offers a disability and life insurance policy to all full-time students registered in the medical and allied professional schools of the medical campus. The Student Health Service offers easy access to medical and psychiatric care so that physical and emotional problems will not interfere with university life. Subsequent medical care is provided as long as full-time enrollment is maintained in the School of Medicine.

The Health Service also pre-screens every incoming student prior to their arrival at the medical school to ensure all federal requirements have been met regarding communicable diseases. Entering students are required to have a medical examination within one year of matriculation and to show proof of immunity to measles (rubeola), rubella and mumps and a tetanus booster within 10 years. The Health Service tracks all immunizations during and prior to enrollment. Statements of Health for internships and practicums are provided.

## **Spouses, Dependents**

Students frequently ask if they can purchase health coverage for their spouse and/or dependents. The Health Service has arranged a few options for you to review. A detailed description of the plans and applications are available at the medical campus Health Service.

## **Dental Care**

There is no provision for treatment of dental problems through the Student Health Service, other than for injury to a sound natural tooth. Students frequently ask where to get dental care at a reasonable cost. Two sources of care have been identified. Students may obtain the names of private dentists that offer quality low cost routine dental care from the Health Service.

The other option is students can purchase dental coverage through a group plan offered through the Health Service. Students who wish to purchase this plan should contact the Health Service for a detailed description of the coverage and application form. Student Health Service will collect the year premium at the time of enrollment. *Enrollment for this plan will close August 30 and will not re-open until August 1 the following year with no exception.* A similar individual plan is also available to the spouse of a student enrolled in the dental plan.

## **Counseling Services**

Students within the Medical Center may have concerns over poor concentration, ineffective study habits, anxiety over their performance, low self-esteem, getting along with others, grief or depression. The psychiatry and clinical psychology staff members are available to help students cope with these concerns. Initial evaluations are made at the Medical Campus Health Service. Subsequent care may be at the Medical Campus or a designated physician's office. Call 362-3523 for more information. All records are confidential and may not be seen by anyone without the student's written consent.

## **Disability Insurance**

All students are covered by group disability insurance. A student who is completely disabled for six consecutive months is eligible to receive \$500 per month benefit. Coverage increases to \$1,300 per month in the third year. Individual disability policies are issued to fourth-year students, increasing the total monthly benefit to \$2,000. Individual policies are portable, guaranteed issue, and can be increased after graduation up to a maximum \$4,700 per month benefit. Call (314) 362-2346 for more information.

## **Life Insurance**

All students are covered by a \$10,000 life insurance benefit. Call (314) 362-2346 for more information.

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## **Dress Code**

While the Washington University School of Medicine does not have a written dress code, it is expected that all students will dress in attire that is appropriate for a professional.

Appropriate attire in the clinical setting is especially important, not only because the student will be part of the team representing the medical profession to patients, but also because the student will be representing the School of Medicine.

Appropriate attire for male students on the clinical services includes man-tailored shirt and tie, trousers or slacks and closed toe shoes. Appropriate attire for female students includes a dress, a blouse, tailored shirt or sweater, and slacks or skirt. Both men and women should wear a short white jacket with the appropriate hospital identification card clearly visible.

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## ***Student Organizations***

Students at Washington University School of Medicine are active participants in medical student organizations on the local, state and national levels. The American Medical Student Association (AMSA), the Student National Medical Association (SNMA), the American Medical Women's Association (AMWA), the Asian-Pacific American Medical Students Association (APAMSA), the Medical Student Section of the American Medical Association (AMA-MSS), the Missouri State Medical Association (MSMA), the Organization of Student Representatives (OSR) in the Association of American Medical Colleges (AAMC) and the Student Organized Community Clinic (SOCC) provide forums for addressing the educational, social and political concerns of medical students. The School of Medicine supports student participation in these national organizations and provides partial funding for travel and other expenses on an annual basis.

### ***Academic Societies***

To foster communication between students and faculty, three academic societies — The Joseph Erlanger and Evarts Graham Society, The Carl and Gerty Cori Society, and The Oliver Lowry and Carl Moore Society — meet independently throughout the academic year to enjoy a social hour, dinner and conversation. The societies promote a collegial environment for the medical school's diverse faculty and student body.

### ***AMA-MSS***

Washington University has an active chapter of the American Medical Association Medical Student Section. WUSM students are involved at the local, state and national levels and represent Washington University in policy development.

### ***AMSA***

On the local level, AMSA is the major student organization at the School of Medicine. The chapter's annual activities include a speaker series and several community service projects. In recent years, the service projects have included an ongoing blood pressure screening program done in conjunction with the American Heart Association.

### ***AMWA***

The American Medical Women's Association is a national organization designed to address issues of concern to women in medicine. Washington University has an active student group and funding is available for student representation at regional and national meetings.

### ***APAMSA***

The Asian-Pacific American Medical Students Association was founded to address issues and needs specific to Asian-Pacific American medical students. To that end, it serves as a support group for students, fosters student-faculty interaction and promotes cultural awareness, as well as providing a framework for community service programs.

### ***Christian Medical and Dental Society***

The Christian Medical and Dental Society (CMDs) fellowship is a nondenominational group that meets on the medical school campus. Part of a national organization founded in 1931, it exists as a source of encouragement, understanding, and support for Christian students, as well as a resource for the entire medical community through information and discussion of such topics as spirituality in patient care, Christian perspectives in medical ethics, and medical missions in the United States and abroad. Weekly meetings, open to anyone, consist of times of prayer, sharing and Bible study.

### ***Forum for International Health and Tropical Medicine***

The Forum for International Health and Tropical Medicine (FIHTM) was formed to promote awareness of international health concerns and facilitate international health experiences for medical students. In addition, the group has worked closely with administration in the design of a formalized international health elective program and funding structure.

### ***Pediatric Care Organization***

The Pediatric Care Organization is a student group working to serve the St. Louis pediatric community. Through this organization, students have the opportunity to work with chronically ill children, provide support for these children's families, and learn about disease in a community-based pediatric setting.

POP is an organization that matches children in the St. Louis area who are suffering from chronic illnesses and the siblings of these children with big brothers and big sisters from Washington University School of Medicine. Medical students meet with their little siblings about every other week, participating in activities that form a meaningful relationship for both the medical student and the child. These activities include going to the zoo, playing on the playground, doing arts and crafts and reading books together. The social work department at St. Louis Children's Hospital serves as a referral source for families, assists in training medical students in dealing with issues associated with chronic disease, and provides ongoing support throughout the duration of the match. The goal of the program is twofold: first, to provide additional love and support to sick children and their families, and second, to allow students to experience firsthand the demands of coping with illness and its stress as it relates to children's everyday lives.

### ***Physicians for Social Responsibility***

The Washington University SPSR chapter provides a forum for students interested in environmental health, nuclear disarmament, gun violence prevention, and other areas in which physician activism may have a positive impact on society. The chapter is affiliated with the national PSR organization and International Physicians for the Prevention of Nuclear War (winners of the 1985 Nobel Peace Prize). Current SPSR projects include medical waste reduction and awareness, youth violence prevention, state and federal-level legislative action, and a series of lunchtime multimedia presentations. In addition to these local projects, Washington University SPSR participates in national PSR programs such as the recent "First Monday Campaign to End Gun Violence."

### ***Program for Women in Science and Medicine***

The Program for Women in Science and Medicine is designed to foster interaction among women at all levels at the medical school. The program sponsors a variety of informal discussions, receptions and dinners with informative speakers throughout the academic year.

### ***SNMA***

The Student National Medical Association (SNMA) is the oldest and largest medical student organization focused around the needs and concerns of African-American, Latino and Native American medical students. This organization is concerned with providing services to medically underserved communities, promoting minority student recruitment and retention to schools that train health personnel and assisting in ways to provide quality education to minorities and women. Washington University has an active SNMA chapter, and funds are available for representation at regional and national meetings as well as for community service activities.

### ***Student Organized Community Clinic (SOCC)***

A student/faculty clinic organized by students to serve the indigent.

### ***Washington University Medical Center Housestaff Auxiliary (WUMCHA)***

WUMCHA is an organization comprised of female medical students, residents, fellows, attending physicians, female spouses and "significant others" of those affiliated with Washington University Medical Center, including Barnes-Jewish and Children's hospitals, the School of Medicine and Mallinckrodt Institute of Radiology. The purpose of the organization is to provide friendship and social support among its members. In addition to sponsoring numerous recreational and educational activities, WUMCHA publishes a Welcome Guide, as well as a directory of members. Annual dues are \$20 and information about membership and applications can be obtained by calling Lynn Schmidt at (636) 536-5283.

### ***Community Service Experience***

Participation in a host of community service projects nurtures the students' altruistic nature and provides an alternative educational experience. University-sponsored, student-run, community-based service activities include the **Perinatal Project**, which provides information concerning well-baby care and prenatal care to women from lower socioeconomic groups and the **Drug Education Project**, which educates inner-city youngsters concerning the effects of drug and alcohol abuse. The **Reproductive Health Project** provides sex education to middle school students. The **Students Teaching AIDS to Students (STATS)** Program allows trained medical students to provide sixth- and seventh-graders with information about AIDS. The combined efforts of medical students, faculty, middle school teachers, parents and speakers with AIDS have made STATS a very successful program. The **CoMoTion project** serves as a clearinghouse for students to participate in a series of St. Louis

outreach programs. Through this project, students have worked in a soup kitchen and shelters for the homeless, supervised a women's center and organized a holiday gift drive for homeless families. The **Domestic Violence Action (DVA)** group has introduced domestic violence issues into the medical school curriculum. These students also organize yearly symposiums on domestic violence for health care workers from the community.

### ***Student Publications***

Students organize and spearhead several publications at the School of Medicine. The Dis-Orientation Guide is produced annually as a student-to-student guide to the curriculum and the city.

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## ***Intramural Program***

Students enrolled in Washington University School of Medicine enjoy an active and diverse Intramural (IM) Program. The IM Program offers students the opportunity to participate in a wide range of sports. Utilizing the state-of-the-art facilities in the University's Athletic Complex, medical students pursue personal athletic interests and enjoy interaction with students enrolled in both undergraduate and graduate degree programs. The IM Program provides an excellent opportunity to socialize with colleagues as well as other graduate students. Differences in curricular demands among participants are considered in scheduling games so that neither academic nor athletic goals are compromised.

Traditionally, the School of Medicine is represented each year by teams or individuals in over 10 intramural sports. In recent years, medical student teams competed in men's and women's flag football, soccer, volleyball, cross country, basketball, swimming, softball, and track and field as well as coed ultimate Frisbee, volleyball, inner tube water polo and softball. In addition, there are different levels of competition so that the needs of both the competitive and recreational athlete can be met.

The School has always made a strong showing in both the mixed and graduate school division, as evidenced by the many championship T-shirts team members sport.

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## ***Transcript Service***

The transcript service is run individually by the first- and second-year classes. It is a self-funded program in which written transcripts are produced for each lecture during the school year. Students alternate various duties, including tape recording, transcribing, copying and distributing the transcripts. It is a voluntary cooperative effort involving interested students (almost all students join) for a relatively modest fee, and is widely viewed as a valuable endeavor.

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## ***Primary Care Summer Preceptorship***

Students appreciate early and sustained patient contact. Since 1996 the school has sponsored a primary care preceptorship program for students during the summer between their first and second years of classes. Students select a preceptor in internal medicine, pediatrics or family practice and spend up to eight weeks observing that physician's clinical practice. A stipend is provided to the

student. Although many of the preceptors are in St. Louis, others, particularly alumni, are located in cities throughout the country. Applications should be made to Leslie Kahl, M.D., Box 8077.

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## ***Student Research Fellowships***

Student research is an important part of the educational program. Fellowships in basic science or clinical areas will be awarded each year to selected students who undertake research projects under the direction of faculty members. Research allows students to discover firsthand the problems and rewards of obtaining and assessing new information, thus adding another dimension to their experience as investigators.

Most students take the opportunity for research during the summer after their first year of classes, but incoming students to the school also are eligible. All research must be carried out at the School of Medicine. Students will be awarded a fellowship and stipend for a two-month program. Inquiries should be made to Student Research Fellowships, Koong-Nah Chung, Ph.D., Box 8107.

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## ***Alpha Omega Alpha***

Alpha Omega Alpha is a national medical honor society. Members are selected by a standing AOA committee during the final year of medical school. Selection is based upon academic performance during the first three years, in addition to other qualities such as leadership. Approximately one-sixth of the class is elected to AOA.

Students elected to AOA are honored at an awards dinner during the final year and at a special AOA lecture.

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## ***Awards and Prizes***

Washington University School of Medicine publicly recognizes and rewards at two annual events outstanding scholarship, research accomplishments and community service of individual students. In December, the Student Awards Luncheon acknowledges academic excellence earned during the first three years of study. As part of the festive commencement activities in May, graduates are recognized for meritorious research and clinical achievements accomplished during their medical school careers.

The Academic Women's Network Leadership Award. Presented to a woman or women in the graduating class who has or have demonstrated outstanding leadership in service to or advancement of women in the community. The 2004 recipient: Celeste Ming Chu.

Morris Alex, M.D. Prize. Awarded each year to the medical student who is outstanding among his or her peers in the second-year Clinical Medicine course. The 2004 recipient: Karen L. Austin.

Alpha Omega Alpha Book Prize. Awarded to a member of the graduating class who has performed outstandingly for the entire medical course. The 2004 recipient: Jason Woods Stephenson.

American Academy of Neurology Medical Student Prize for Excellence in Neurology. Awarded to a member of the graduating class for excellence in clinical neurology and outstanding personal qualities of integrity, compassion and leadership. The 2004 recipient: Emily Lin Ho.

American College of Physicians Kenneth S. Polonsky, M.D. Book Award. Presented annually to a member of the graduating class committed to a career in internal medicine, in recognition of highest achievement in the field of internal medicine. The 2004 recipient: Cara Louise O'Brien.



American College of Physicians Award for Excellence in Physical Diagnosis. Two recipients are selected annually based on their outstanding performance in the second-year Clinical Medicine course. The 2004 recipient: Jill E. Gibson.

American College of Physicians Clerkship Award. Established in 1992 to be awarded to a student completing the third year of study with meritorious achievement in the Internal Medicine Clinical Clerkship. The 2004 recipient: Andrea J. Bullock.

American Medical Women's Association Glasgow-Rubin Memorial Achievement Citations. Presented to women medical students graduating in the top 10 percent of their class. The 2004 recipients: Erica Lynne Brooks, Rachel L. Fowler, Erica Jean Rogers Gelber, Avital Harari, and Cara Louise O'Brien.

American Medical Women's Association Janet M. Glasgow Memorial Award. Presented to a woman graduating first in her class.

Association for Academic Surgery Student Research Award. Recognizes outstanding research efforts by a graduating medical student interested in a surgical career.

The Ruth Bebermeyer Award. Established in 2001 by the WUMCAA executive council to honor Ruth Bebermeyer for her many years of dedicated service to WUMCAA (1990-2000) and to the students of the School of Medicine. The award is given to "a student who has shown extraordinary kindness and sensitivity to the needs of others," whether those others be fellow students, patients, or just people in general. The 2004 recipient: Amy K. Nunnikhoven.

Alexander Berg Prize. Awarded to the student presenting the best results in research in molecular microbiology. The 2004 recipients: Joseph Perry Gaut and Daniel Lewis Popkin.

Jacques J. Bronfenbrenner Prize. Provided by Dr. Bronfenbrenner's students in memory of his inspiration as a teacher and a scientist, and awarded to the member of the graduating class who, in the judgment of the Chairman of the Department of Medicine, has done the most outstanding work in infectious diseases or related fields. The 2004 recipient: Jason Woods Stephenson.

Dr. Richard S. Brookings and Robert Carter Medical School Prizes. Provided for medical students through a bequest of Robert S. Brookings. The 2004 Dr. Richard S. Brookings recipients: Jonathan C. Baker, Justis P. Ehlers, Cara L. O'Brien, and Ephrem Odoy Olweny. The 2004 Robert Carter recipients: Rachel L. Fowler, David Akinyele Hampton, Erica J. Rogers, and Ryan Menzies Tierney.

Dr. Harvey Butcher Prize in Surgery. Awarded annually in memory of Dr. Harvey Butcher to the member of the graduating class who, as judged by the Department of Surgery, shows the greatest promise for general surgery. The 2004 recipient: Elizabeth Anderson Fialkowski.

Kehar S. Chouke-George Gill Prize in Anatomy. Awarded annually to a first-year medical student who has demonstrated superior scholarship in anatomy. The 2004 recipient: Marios Giannakis.

Class of 2001 Award. Established by the Class of 2001 as its gift to the medical school. Awards are to be given to third-year medical students in recognition of outstanding performance in the areas of community service and student group activities in the first two years of medical school. The 2004 recipient: Kristina A. Toncray.

Class of 2003 Award is dedicated to the memory of three classmates, who died in a car accident, and is awarded to a first year student recognized by peers as being selfless, exceptionally kind to others, and dedicated to the highest standards in medicine. The 2004 recipient: Rosanna L. Wustrack.

Carl F. and Gerty T. Cori Prize in Biochemistry. Awarded at the end of the first year to the members of the class who has demonstrated superior scholarship in Biochemistry. The 2004 recipients: Stephen S. Chung and Lora R. Pearlman.

Edmund V. Cowdry Prize in Histology. Established in 1969 to honor Dr. Cowdry; awarded to a medical student in the first-year class who has performed meritoriously in microscopic anatomy. The 2004 recipient: Shreeram Akilesh.

Antoinette Frances Dames Award in Cell Biology and Physiology. Awarded annually to members of the first-year class who have demonstrated superior scholarship in these fields. The 2004 recipients: Shreeram Akilesh, Kao-Ping Chua, and Bryce A. Mendelsohn.

Elisabeth L. Demonchaux Prize in Pediatrics. Established in 1985, the prize is awarded annually to a graduating student who has done outstanding work in pediatrics. The 2004 recipient: Lindsay Anne Peakman.

Distinguished Minority Medical Student Scholarship Prizes. Provided by African-American alumni and friends of Washington University School of Medicine, the prizes are awarded to Minority Scholarship recipients in recognition of their achievements in the first and second year of the curriculum. The 2004 recipients: Justin M. Burton and Cynthia E. Rogers.

Steven Dresler Prize. Awarded to a graduating student who has demonstrated a commitment to promoting social good, civil rights and civil liberties through social action and volunteerism. The 2004 recipient: Nathan C. Page.

Dr. William Ellis Award. Established in 1990 by Dr. Ellis and awarded to a senior student in recognition of meritorious research in ophthalmology. The 2004 recipient: Alex Yuan.

The Endocrine Society Medical Student Achievement Award. Recognizing a graduating medical student who has shown special achievement and interest in the general field of endocrinology. The 2004 recipient: Amy Deanne Slansky.

The Family Health Foundation of Missouri Scholarship Award. Presented in recognition of academic achievement of a graduating medical student entering the specialty of family practice.

George F. Gill Prize in Pediatrics. Awarded to a member of the graduating class who has demonstrated superior scholarship in pediatrics. The 2004 recipient: Jessica Erin Pittman.

Max and Evelyn Grand Prize. Established in 1985 by Dr. M. Gilbert Grand, the prize is awarded annually to a fourth-year medical student for excellence in ophthalmic research or clinical ophthalmology. The 2004 recipient: Matthew Daniel Council.

R.R. Hannas Award for Excellence in Emergency Medicine. Offered annually by the Missouri Chapter of the American College of Emergency Physicians for exceptional performance in emergency medicine. The 2004 recipient: Jason K. Wong.

Dr. John Esben Kirk Scholastic Award. Established in 1975 and awarded to a graduating student of high scholastic standing. The 2004 recipients: Jonathan Craig Baker and Justin Potter Ehlers.

Louis and Dorothy Kovitz Senior Prize in Surgery. Senior award in surgery recognizing a member of the graduating class who has shown the most outstanding ability, zeal and interest in surgical problems. The 2004 recipient: Joseph Perry Gaut.

I. Wallace Leibner Award. Established in 1988 in memory of Dr. Leibner, the award is given to the member of the graduating class who has demonstrated outstanding ability in the clinical practice of medicine. The 2004 recipient: Erica Lynne Brooks.

Irwin Levy Prize in Neurology and Neurological Surgery. Established in 1980 by friends of Dr. Levy as a tribute to his commitment to clinical teaching. Provides a prize for the student who presents the best performance in the neurology and neurological surgery clerkships. The 2004 recipient: Cara Louise O'Brien.

Oliver H. Lowry Prize in Pharmacology. Awarded to a second-year medical student for academic excellence in pharmacology. The 2004 recipient: Ling-Chih Liang.

Edward Massie Prize for Excellence in Cardiology. Awarded to the member of the graduating class, selected by the director of the Division of Cardiovascular Disease in the Department of Medicine, who has done the most outstanding clinical or basic research work in the field of cardiovascular disease. The 2004 recipient: Cara Louise O'Brien.

Howard A. McCordock Book Prize in Pathology. Awarded at the end of the second year to a member of that class for general excellence in pathology. The 2004 recipient: Cynthia E. Rogers.

McGraw-Hill/Appleton & Lange Medical Student Book Award. Awarded annually to medical students for high scholastic standing. The 2004 recipients: Ian G. Dorward, Ian R. P. Sunderland, and Benjamin D. Womack.

Medical Center Alumni Scholarship Fund Prize. Given annually to a student who has shown excellence in his or her work during the preceding year. The 2004 recipient: Chad M. Sylvester.

Medical Fund Society Prizes. One prize awarded annually to a graduating student who has excelled in the study of internal medicine; one prize awarded annually to a student of the fourth-year class who has excelled in the study of surgery. No individual is eligible for both prizes. The 2004 recipients: Jeremy Benjamin Richards (Medicine) and Rita Ophelia Kwan (Surgery.)

Merck Manual Awards. Given to three graduating medical students for scholastic achievement in medical studies. The 2004 recipients: Peggy Lee Ann Chern, Riley Erickson Greene, and Alison Kay Snyder-Warwick.

Missouri State Medical Association Award. Presented annually to honor graduates of the senior class. The 2004 recipients: Jonathan Hero Chung, Nathan Clarke Page, and Ryan Menzies Tierney.

Dr. Helen E. Nash Academic Achievement Award. Given annually to a student who has exhibited to an unusual degree the qualities of industry, perseverance, determination and enthusiasm. The prize is given in honor of Dr. Helen Nash, a pediatrician noted in the St. Louis community for her commitment to excellence, tireless advocacy on behalf of children and endless enthusiasm for the field of medicine. The 2004 recipient: Jason W. Stephenson.

The Dr. Philip Needleman Pharmacology Prize. Established by his family in 1989 to honor Dr. Needleman, who was Chairman of the Department of Pharmacology from 1976-1989. This annual award is given to a member of the graduating class for outstanding research in pharmacology.

James L. O'Leary Neuroscience Prize. Awarded annually to a student who demonstrates the best accomplishments in the Neuroscience course. The 2004 recipient: Ling-Chih Liang.

Roy Peterson Award in Anatomy. Awarded for outstanding performance in the Gross Anatomy course in recognition of Dr. Peterson's many contributions as a teacher in the School of Medicine. The 2004 recipient: Shreeram Akilesh.

The Richard and Mildred Poletsky Education Fund. Established in 1995 by the family of Mr. Richard Poletsky, an alumnus of Washington University. A prize is awarded annually to a professional student in the health sciences whose interest is in research on dementia and care of demented patients.

Dr. Philip Rosenblatt Award in Pathology. Given to a medical student for distinguished performance during an elective in pathology or laboratory medicine. The 2004 recipient: Brian Todd Edelson.

St. Louis Pediatric Society Senior Prize. Presented to the senior student showing the greatest promise in clinical pediatrics. The 2004 recipient: Molly Lauren Lacy.

David F. Silbert Outstanding Teaching Assistant Award. Established in memory of Dr. David Silbert, it is awarded to a teaching assistant in a medical school course in recognition of a commitment to teaching. The 2004 recipient: Shandiz Tehrani.

John R. Smith Memorial Fund Award. Created in 1982, it is awarded to a medical student who has done meritorious clinical and/or research work in the Division of Cardiovascular Disease within the Department of Medicine. The 2004 recipient: Rita Ophelia Kwan.

Dr. Margaret G. Smith Award. Given to a woman medical student for outstanding achievement in the first two years of medical school. The 2004 recipient: Cynthia E. Rogers.

Society for Academic Emergency Medicine Excellence in Emergency Medicine Award. Based on demonstrated excellence in the specialty of emergency medicine, it is awarded to a senior medical student at Commencement. The 2004 recipient: Susan Renee Wilcox.

Samuel D. Soule Award in Obstetrics and Gynecology. Presented to a member of the third- or fourth-year class for meritorious achievement in either basic or clinical investigation in obstetrics and gynecology. The 2004 recipient: Andrea Ruth Hagemann.

Jessie L. Ternberg Award. Presented to a woman graduating from the School of Medicine who best exemplifies Dr. Ternberg's indomitable spirit of determination, perseverance and dedication to her patients. The 2004 recipient: Kathryn L. Carlson.

Washington University Internal Medicine Club Research Award. Awarded to the member of the graduating class who has done the most significant research in any area of internal medicine. The 2004 recipient: Maxwell Masters Krem.

Washington University Summer Research Prize. The award recognizes a student for meritorious research in the Summer Research Fellowship Program at Washington University School of Medicine. The 2004 recipient: Stephen M. Olson.

Samson F. Wennerman Prize in Surgery. Donated by his wife, Zelda E. Wennerman, and awarded annually to the fourth-year student who has demonstrated promise in the field of surgery. The 2004 recipient: Avital Harari.

Doris P. and Harry I. Wexler Fund. Established in 1998 by a bequest from Mrs. Wexler, the prize is awarded annually for research in multiple sclerosis and in alternate years research in eye disease. The 2004 recipient: Justis Potter Ehlers.

Park J. White, M.D. Prize. Created in 1992 in honor of the centennial of the birth of Dr. White, who was a distinguished pediatrician, social activist and pioneer teacher of medical ethics. He introduced the first course on medical ethics to students in 1927. The prize is awarded to a student for outstanding performance in the ethics elective offered by the Program for the Humanities in Medicine. The 2004 recipients: Elizabeth Habermeld and Avital Harari.

Hugh M. Wilson Award in Radiology. Given annually to a graduating medical student in recognition of outstanding work in radiology-related subjects, either clinical or basic science. The 2004 recipient: Kelsey James Moran.

The Wynder Prize in Preventive Medicine. An annual prize established in 1994 and awarded to senior medical students who have done the best research in preventive medicine. The 2004 recipient: David Akinyele Hampton.

James Henry Yalem Prize in Dermatology. Established by Charles Yalem in memory of his son and awarded annually to a member of the fourth-year class for outstanding work in dermatology. The 2004 recipients: Erica Jean Rogers Gelber and Riley Erickson Greene.

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## **The Washington University Graduate**

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## ***Residency Training***

Although not required by all states for licensure, postgraduate residency training in an approved hospital is considered essential preparation for the practice of medicine. Most Washington University graduates serve three or more years of residency training, and many will gain additional experience as postdoctoral fellows.

In order to aid students in obtaining desirable residency appointments, an active counseling program is maintained. Students in their first, second and third year can participate in career counseling workshops in which they are given very specific information about subspecialties. They are encouraged to look at their own interests, attributes and priorities and, with this information, begin to make decisions about the specialty best suited for them. In addition, small group conferences are held for students to meet with faculty members from a variety of the specialty divisions at Washington University in order to learn more about the fields that they are interested in.

During their third and fourth year, students interact closely with the Career Counseling Office, which provides them with individual counseling to help plan for the residency application process. Students receive general background information about the kinds of residencies available, special issues concerning certain extremely competitive residencies and help identifying faculty members for further assistance. The Career Counseling Office maintains a web site ([medicine.wustl.edu/~residenc](http://medicine.wustl.edu/~residenc)) where students can find information regarding 20 different residency specialties. As the number of residencies may gradually decrease to closely approximate the number of graduates applying, students must make their choices with considerable care. The School participates in the National Resident Matching Program, which offers distinct advantages to applicants.

Results of these efforts have been gratifying. The PGY-1 residencies selected in the most recent residency matching (2004) are identified in the Alphabetical List of Students area in the Register of Students section.

The School maintains an active interest in its graduates and is pleased to assist them in subsequent years as they seek more advanced training or staff appointments in the communities in which they settle.

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## ***Postdoctoral Training***

Those departments that offer postdoctoral fellowships individualize such educational activity up to a maximum of 36 months of academic time. Such fellowships lead integrally to certification by the appropriate specialty and/or subspecialty boards of the American Medical Association.

### **Fellowship And Other Funds**

Alexander and Gertrude Berg Fellowship Fund. Created in 1952 through the bequest of Gertrude Berg to provide a fellowship in the Department of Molecular Microbiology.

Glover H. Copher Fellow in Surgical Research. Established in 1971 to support a postdoctoral fellow in surgery.

William H. Danforth Loan Fund for Interns and Residents in Surgery. Provides financial assistance in the form of loans for postdoctoral students in surgery.

Frederick Lee Hawes Fellowship in Congestive Heart Failure. Established in 1998 to provide a one-year fellowship in congestive heart failure.

Antonio Hernandez, Jr. Fellowship in Pediatric Cardiology. Established in 1987 as a memorial to Dr. Hernandez.

Leopold and Theresa Hofstatter Fellowship. Established in 2000 from the estate of Leopold and Theresa Hofstatter to be used to support fellowships in neurological research.

J. Albert Key Fellowship Fund. Provides a stipend for a fellow in orthopaedic surgery.

Louis and Dorothy Kovitz Fellowship Fund. Established in 1970 by an alumnus and his wife to provide support for research by qualified residents or students interested in surgery, at the discretion of the Head of the Department of Surgery.

Stephen I. Morse Fellowship. Established in 1980 by Carl and Belle Morse in memory of their son; awarded to predoctoral or postdoctoral students pursuing research careers in microbiology, immunology and infectious diseases.

William D. Owens Anesthesiology Research Fellowship. Established in 2000 in honor of William D. Owens, M.D. This fund will allow an individual to do a clinical or basic research fellowship for a two-year period.

Julio Santiago Fellowship. Established in 1998 in memory of Dr. Julio Santiago by the John Henry and Bernadine Foster Foundation to provide one year of advanced training for a Pediatric

Metabolism/Diabetes Fellow.

The Esther and Morton Wohlgemuth Foundation Fellowship. Established to support a fellow in the Division of Cardiovascular Diseases.

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## ***Continuing Medical Education***

The study of medicine is a lifelong process with continuing medical education being an integral part of the continuum. Since 1973 the School of Medicine has supported this learning endeavor through the operation of the Continuing Medical Education Program. Continuing Medical Education's mission is to provide learning opportunities through periodic courses, regularly scheduled conferences, and enduring materials related to all areas of medical practice to local, national and international physicians and other health professionals that result in improved skills, attitude, competency and performance and increased knowledge in order to improve health care.

Pursuant to this mission the objectives of the continuing medical education program include the following:

- o Enable the acquisition of new knowledge and skills through periodic courses, regularly scheduled conferences, and enduring materials for the delivery of quality patient care.
- o Translate the results of research to clinical diagnosis and treatment for practicing physicians.
- o Apply educational approaches in support of continuous quality improvement in health care delivery.
- o Integrate clinical outcome measures for delivery of quality patient care into the educational process.
- o Assist physician's adaptation to changing health care delivery environments.
- o Support faculty development as postgraduate medical educators and leaders.

Each year more than 40 symposia and more than 150 recurring academic rounds and conferences as well as videos and monographs are provided with CME credit by this office. About 5,000 registrants attend these courses annually and receive more than 90,000 hours of instruction. CME-Online provides educational programs via the Internet. Since starting in 2000, the program has grown to include more than 60 hours of potential CME credit. The URL is <http://cme.wustl.edu>. The educational program is fully accredited by the Accreditation Council for Continuing Medical Education and provides credits to physicians seeking them for the Physician's Recognition Award of the American Medical Association, as well as various other types of state and specialty recertification and relicensure activities.

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## ***Medical Alumni and Development Programs***

The Department of Medical Alumni and Development Programs works with individuals and organizations to secure the human and financial resources necessary to help the School of Medicine achieve and maintain excellence in research, teaching and patient care.

### **Washington University Medical Center Alumni Association**

The Washington University Medical Center Alumni Association (WUMCAA) was organized more than 60 years ago to foster a continuing spirit of fellowship among graduates, and to maintain and enhance the tradition of excellence of the School of Medicine. Membership is provided to graduates and former house staff of the Medical Center.

The association complements the goals and purposes of the School of Medicine through a variety of programs for its members and current students. Involvement in these activities also provides the opportunity to continue the relationships begun as students and to develop rewarding professional associations.

### **Student-Alumni Programs**

The Office of Medical Alumni and Development Programs and the Alumni Association assist students in

a variety of ways. The Association makes a substantial financial commitment each year to support 16 Distinguished Alumni Scholars. These promising medical students receive full tuition, four-year scholarships in honor of great teachers and mentors who were also alumni of the School of Medicine. The Association also provides an activity fund for both the first- and second-year classes and sponsors a reception for the graduating class, their families and faculty.

In addition, the Association provides financial support to a number of student-initiated community service activities, including a variety of health education programs in public schools and clinics.

Medical Alumni and Development coordinates an alumni resource bank that arranges more formal contacts between alumni and students. Alumni volunteers host students who wish to spend time with a practicing physician, provide information to help students choose a specialty, serve as preceptors for clerkships and electives, and provide overnight lodging to fourth-year students going on residency interviews.

## **Reunions and Other Events**

The Annual Reunion is held in May for medical classes who return at five-year intervals, beginning with the class observing its 10th year following graduation and continuing through the class celebrating its 60th reunion. The reunion schedule includes a scientific program, social events, tours of the Medical Center and the presentation of Alumni/Faculty, Alumni Achievement and Distinguished Service awards. Award recipients are chosen on the basis of personal accomplishment, professional achievement and/or service to the School of Medicine. Members of the graduating class are special guests at the awards banquet and are officially welcomed into Association membership.

The Alumni Office sponsors special alumni activities in selected cities across the United States. Volunteers from each area assist in sponsoring these events, which help alumni to stay abreast of the educational and research activities at the School of Medicine. The Alumni Office also compiles class newsletters for selected classes, including recent graduates and those in the "Diamond+" years (all those classes who have celebrated their 60th reunion).

## **Alumni Support**

Supporting their school generously is a tradition for a large percentage of alumni of the medical school and the affiliated health programs. Each year alumni and friends make gifts to the Annual Fund, which supports the School's departments, divisions and health care professional programs, as well as scholarships and low-interest loan programs for students. Alumni also designate gifts for special purposes within the School, including specific research, education and training programs.

In 1977, School of Medicine members of the Eliot Society created the Alumni Endowed Professorship Program, through which gifts are used to establish an Alumni Endowed Chair in the School's departments. Eight such chairs have been created thus far.

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## **Standards, Policies, Student Constitution and Bylaws**

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## ***Washington University Policy on Sexual Harassment***

### **I. Introduction and Policy Statement**

Washington University is committed to having a positive learning and working environment for its students, faculty, and staff and will not tolerate sexual harassment.

Sexual harassment is an attack on the dignity of individuals and the integrity of the University as an institution of learning. Academic freedom can exist only when every person is free to pursue ideas in a non-threatening, non-coercive atmosphere of mutual respect. Sexual harassment is reprehensible and threatening to the careers, educational experience, and well-being of all members of our community.

Sexual harassment is a form of discrimination that violates University policy. It is also illegal under state and federal law.

This Policy applies to all members of the Washington University community. It allocates responsibilities for helping to ensure that University policy is fairly applied, explains the processes by which complaints of sexual harassment may be brought forward, and provides sanctions for sexual harassment, which may range from reprimands to termination or dismissal, depending on the severity of the offense. If you believe you have been sexually harassed, Sections IV and V describe options about what you can do and where you can get help. If you believe you have been falsely accused of sexual harassment, the procedures set out below are also available to you. Those charged with implementation of this Policy will, whenever appropriate, encourage and assist those who believe they may have been sexually harassed to pursue the assorted informal means outlined in Section IV below for securing the cessation of unwelcome and offensive conduct.

### **II. What is Sexual Harassment?**

For the purposes of this statement, Washington University has adapted the Equal Employment Opportunity Commission (EEOC) definition of sexual harassment for an academic community: Sexual harassment is defined as any unwelcome sexual advance, request for sexual favor, or other unwelcome verbal or physical conduct of a sexual nature, whether committed on or off campus, when

(1) submission to such conduct is made, either explicitly or implicitly, a term or condition of an individual's employment or academic advancement;

(2) submission to or rejection of such conduct by an individual is used as the basis, or threatened to be used as the basis, for employment or academic decisions or assessments affecting an individual; or

(3) such conduct has the purpose or effect of unreasonably interfering with an individual's work or educational performance or creating an intimidating or hostile environment for work or learning. Such conduct will typically be directed against a particular individual or individuals and will either be abusive or severely humiliating, or will persist despite the objection of the person targeted by the speech or conduct.

Sexual harassment includes but is not limited to situations where one person has authority over another. In such situations, sexual harassment is particularly serious because it may unfairly exploit the power inherent in a faculty member's or supervisor's position.

Sexual harassment can be verbal, visual, physical, or communicated in writing or electronically. Some conduct obviously constitutes sexual harassment — such as a threat that a grade or promotion will depend on submission to sexual advance. But whether particular conduct constitutes sexual harassment will often depend on the specific context of the situation, including the participants' reasonable understanding of the situation, their past dealings with each other, the nature of their professional relationship (e.g., supervisor-subordinate, colleague, etc.), and the specific setting. The inquiry can be particularly complex in an academic community, where the free and open exchange of ideas and viewpoints preserved by the concept of academic freedom may sometimes prove distasteful, disturbing or offensive to some. Examples of conduct which may constitute sexual



harassment include but are not limited to:

- requests for sexual favors
- hugging, rubbing, touching, patting, pinching, or brushing another's body
- inappropriate whistling or staring
- veiled suggestions of sexual activities
- requests for private meetings outside of class or business hours for other than legitimate mentoring purposes
- use in the classroom of sexual jokes, stories, or images in no way germane to the subject of the class
- remarks about a person's body or sexual relationships, activities or experience
- use of inappropriate body images to advertise events

Members of the University community can expect to be free from sexual harassment, and thus all members of the University community should guard against it. The fact that someone did not intend to sexually harass an individual is generally not considered a sufficient defense to a complaint of sexual harassment, although the reasonableness of the accused's perceptions may be considered. In most cases, it is the effect and characteristics of the behavior on the complainant and whether a reasonable person similarly situated would find the conduct offensive that determine whether the behavior constitutes sexual harassment.

### **III. Confidentiality**

The University will strive to protect, to the greatest extent possible, the confidentiality of persons reporting harassment and of those accused of harassment. Because the University has an obligation to address sexual harassment, however, the University cannot guarantee complete confidentiality where it would conflict with the University's obligation to investigate meaningfully or, where warranted, take corrective action. Even when some disclosure of the University's information or sources is necessary, it will be limited to the extent possible. The University will, to the extent permitted by law, keep confidential all records of complaints, responses and investigations. The records maintained by the Sexual Harassment Response Coordinator shall be available only to the Coordinator and, to the extent necessary, to administrators and other supervisors charged with responding to allegations of harassment. Allegations of sexual harassment shall not be placed in student records or personnel files unless, after appropriate investigation, such allegations have been sustained. Records maintained by the Coordinator of allegations which do not lead to formal hearings or personnel actions will be discarded after five years unless there are additional, more recent complaints against the same person.

If you want to discuss possible harassment in a more confidential setting or clarify your feelings about whether and how you wish to proceed, you may want to consult a social worker, therapist, or member of the clergy, who is permitted, by law, to assure greater confidentiality. Clergy and counseling resources on campus are listed in Bearings, Ternion, and Safety and Security on the Hilltop Campus. In addition, any member of the University community may contact the Student Counseling Services at 935-5980 for a confidential discussion and, if desired, referral to off-campus resources.

### **IV. Seeking Advice; Making a Complaint**

If you believe that you have been sexually harassed, you have a number of response options, both formal and informal. Some people may wish to pursue informal means instead of or before making a formal complaint; others will not. If an informal procedure is ineffective, the formal procedures will remain open to you. You should select the route you feel most appropriate for your circumstances. However you wish to proceed, you may consult at any time with the Hilltop or Medical Center Sexual Harassment Response Coordinator (listed in the Appendix), whose responsibilities include assisting students, faculty and staff with sexual harassment issues, be they general or specific, formal or informal. You may wish to work with the Coordinator to select an approach.

#### **A. Informal Procedures**

1. If you feel comfortable dealing with the situation without assistance, you can:
  - a. Clearly say "no" to the person whose behavior is unwelcome.
  - b. Communicate either orally or in writing with the person whose behavior is unwelcome. The most useful communication will have three parts:
    - (1) A factual description of the incident(s) including date, time, place and specific action.
    - (2) A description of the writer's feelings, including any consequences of the incident.
    - (3) A request that the conduct cease.

Frequently such a communication will cause the unwelcome behavior to stop, particularly where the person may not be aware that the conduct is unwelcome or offensive.

**2.** If you would like to proceed informally, but with the assistance of someone else, you can:

a. Ask the person's supervisor, e.g., department chair, dean, director, housing office representative, academic advisor, or resident advisor, to speak to the person whose behavior was unwelcome. The purpose of such conversations is the cessation of unwelcome behavior.

b. Consult with the Coordinator or one of the Sexual Harassment Response Advisors listed in the Appendix and specifically charged with responding to sexual harassment inquiries and complaints. These individuals are thoroughly familiar with University policy on sexual harassment and are available to consult with victims of sexual harassment, those charged with sexual harassment, witnesses, and supervisors of parties to a complaint. They can provide information about informal actions that might remedy the situation and discuss University policy on sexual harassment and procedures for resolving complaints.

c. Ask the Coordinator to mediate or arrange for mediation. Mediation is discussion and negotiation, with the help of a third party, designed to permit the parties to reach a mutually agreeable resolution of a dispute. If a person complaining of sexual harassment seeks mediation, the person accused of harassment agrees, and the Coordinator concludes that mediation would be consistent with the University's legal obligations in responding to and preventing sexual harassment, the Coordinator may mediate or arrange for mediation.

## ***B. Formal Procedures***

Whether or not you have attempted to resolve a sexual harassment claim through informal means, you may initiate a formal sexual harassment grievance proceeding by filing a written complaint. This process may lead to a formal hearing at which evidence will be considered and witnesses heard. If this is the course you wish to take, the Coordinator can assist you in filing a complaint.

Complaints, prepared with or without the assistance of the Coordinator, can be filed with the following Committees, with a copy to the Coordinator for your campus:

Complaints against faculty or staff:

*Faculty and Administrative Affirmative Action Committee*  
(complaints by faculty and administrators)

*Title IX Grievance Committee*  
(complaints by students)

*Human Resources Advisory Committee*  
(complaints by staff)

All of these committees may be contacted  
c/o Office of Human Resources  
North Brookings Hall, Room 126  
Campus Box 1184  
935-5990

Hearing procedures are set out in the Washington University Discrimination and Sexual Harassment Hearing Procedures. These procedures may be obtained from the Office of Human Resources or from any of the Sexual Harassment Response Coordinators or Advisors.

Complaints against students or student groups:

Office of the Judicial Administrator  
Women's Building, Room B27  
Campus Box 1136  
935-4062

Hearing procedures are set out in the University Judicial Code, found in Bearings and Washington University Faculty Information. These procedures may also be obtained from the University Judicial Administrator or from the Sexual Harassment Response Coordinator or Advisors.

Whether or not you choose to file a formal complaint, the University may be required, or may otherwise deem it necessary and protective of the academic community, to commence its own investigation.

## **V. Protection of Rights**

The University will not tolerate retaliation or discrimination against persons who report or charge sexual harassment or against those who testify, assist, or participate in any investigation, proceeding, or hearing involving a complaint of sexual harassment. In this context, retaliation means speech or conduct that adversely affects another's terms or conditions of employment or education and is motivated by an intent to harm the targeted person because of his or her participation in the filing or investigation of an allegation of sexual harassment. Any such retaliation — or any encouragement of another to retaliate — is a serious violation of University policy and law, independent of whether the particular claim of sexual harassment is substantiated. If you believe you have been subjected to retaliation in violation of this rule, you may use the procedures described above to complain and seek redress.

The University seeks to protect the rights of all persons, accusers and accused, to fair procedures. Accusations of sexual harassment typically have injurious and far-reaching effects on the careers and lives of accused individuals. Allegations of sexual harassment must be made in good faith and not out of malice. Knowingly making a false or frivolous allegation of sexual harassment, whether in a formal or informal context, will be treated as a serious offense under this policy and, where it applies, the University Judicial Code. If you believe you have been falsely accused of sexual harassment you may use the procedures of this policy or the University Judicial Code, where applicable, to seek redress. See Section IV, above.

## **VI. Obligations of Vigilance and Reporting**

The University can respond to specific instances and allegations of harassment only if it is aware of them. The University therefore encourages anyone who believes that he or she has experienced sexual harassment to come forward promptly with inquiries, reports or complaints and to seek assistance from the University. In addition, any University employee who becomes aware of instances or allegations of sexual harassment by or against a person under his or her supervisory authority must report it to those charged with responding to such allegations and reports: the appropriate dean, director or department head or other similar administrator or to the Sexual Harassment Response Coordinator or one of the Advisors. It shall be the responsibility of these individuals to respond to allegations and reports of sexual harassment or refer them to other University officials for such response.

Any dean, director or department head, or other similar administrator who becomes aware of information indicating a significant likelihood of sexual harassment must report such information to the Sexual Harassment Response Coordinator for the appropriate campus. These administrators must respond not only when they receive a specific complaint or report alleging improper activity, but also when such matters come to their attention informally. Unconfirmed or disputed allegations should be clearly labelled as such and reports should indicate any steps already taken to investigate or otherwise respond. Administrators may wish to consult with the Coordinator or any of the Advisors prior to investigating or otherwise responding to any situation involving alleged harassment.

## **VII. Possible Sanctions**

Possible sanctions for a person found guilty of behavior in violation of this policy include but are not limited to the following:

- oral or written reprimand, placed in personnel file
- required attendance at a sexual harassment sensitivity program
- an apology to the victim
- oral or written warning
- loss of salary or benefit, such as sabbatical or research or travel funding
- transfer or change of job, class or residential assignment or location (i.e., removing the person from being in a position to retaliate or further harass the victim)
- fine
- demotion
- suspension, probation, termination, dismissal or expulsion

While counseling is not considered a sanction, it may be offered or required in combination with sanctions. Where alcohol is involved in the sexual harassment, such counseling may include an alcohol abuse program.

If students or student groups are guilty of sexual harassment any of the sanctions set forth in the University Judicial Code may also be invoked.

## **VIII. Education**

The best way to deal with sexual harassment is to prevent it. Education is essential to eliminating sexual harassment. Washington University has developed an ongoing training program. Please call a Sexual Harassment Response Coordinator or Advisor to find out more about these programs, what sexual harassment is, how to respond to it, and what to do when someone asks for advice about sexual harassment.

### **Appendix: Sexual Harassment Coordinators and Advisors (as of June 30, 2001)**

#### *Hilltop Campus*

Coordinator: Ann Prenatt, 935-8046

Advisors: Kathy Steiner-Lang (complaints by students and others), 935-5910;

To be named (complaints by faculty and others); Pamela Lokken (complaints by staff and others), 935-5752

#### *Medical Campus*

Coordinator: Barbara Cant, 362-4900

Advisors: Leslie Kahl (complaints by students and others), 362-7481;

Apryle Cotton (complaints by faculty, staff and others), 362-7198

Please Note: Other Advisors will be appointed, including men. All appointments are subject to change.

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## **Washington University School of Medicine Policy Against Abusive Conduct**

### **I. Policy Statement**

Washington University School of Medicine (WUSM) is committed to having a positive learning and working environment for its students, faculty, and staff. All individuals have the right to enjoy an environment free from all forms of conduct that can be considered harassing, threatening or intimidating. In addition, academic freedom can exist only when every person is free to pursue ideas in a non-threatening atmosphere of mutual respect. WUSM is committed to protecting the academic freedom and freedom of expression of all members of the school community and this policy against abusive conduct will be applied in a manner that protects those freedoms. Abusive conduct is reprehensible and threatening to the careers, educational experience, and well being of all members of our community and will not be tolerated. This policy applies to all students, faculty and staff and is in addition to the Washington University Policy on Sexual Harassment.

### **II. What is Abusive Conduct?**

Abusive conduct is behavior that creates an intimidating environment and is likely to interfere with an individual's work or education. This conduct can be verbal, visual, physical, or communicated in writing or electronically. Such conduct is typically directed against a particular individual or individuals. It includes, but is not limited to, situations where one person has authority over another. In such situations, abusive conduct is particularly serious because it may unfairly exploit the power inherent in a faculty member's or supervisor's position.

Examples of conduct that may be considered abusive include but are not limited to:

- Threatening or intimidating behavior or words (written or oral)
- Obscenities/profanities (verbal or gestures) directed at a person
- Threatening or obscene gestures, jokes or cartoons
- Degrading a person or a group on the basis of a personal or cultural characteristic
- Taunting, jeering, mocking or humiliating another person through acts or words
- Screaming and/or yelling at or around others
- Insulting someone, especially in the presence of others
- Endangering the safety of an individual or individuals

In considering a complaint under this policy, the following understandings shall apply:

1. Abusive conduct must be distinguished from behavior which, even though unpleasant or disconcerting, is appropriate to the carrying out of certain instructional, advisory, or supervisory responsibilities. In the context of patient care clear and direct communication may be necessary in order to deliver safe, effective, appropriate and timely clinical treatment.
2. Instructional responsibilities require appropriate latitude for pedagogical decisions concerning the topics discussed and methods used to draw students into discussion and full participation.

The fact that someone did not intend to be abusive is generally not considered a sufficient defense to a complaint, although the reasonableness of the accuser's perceptions may be considered. In most cases, it is the characteristics and the effect of the behavior on the complainant and whether a reasonable person would find the conduct abusive that determines whether the behavior was abusive.

### **III. Reporting Abusive Conduct**

The Medical School can respond to specific instances and allegations of abusive conduct only if it is aware of them and therefore encourages anyone who believes that he or she has experienced abusive conduct to come forward promptly with inquiries, reports, or complaints and to seek assistance. In addition, any faculty member, manager, or employee who becomes aware of instances or allegations of abusive conduct, by or against a person under his or her supervisory authority, is required to report it to the appropriate dean, director, department head or other similar administrator or to the Human Resources Department. Once a complaint is received, it is the responsibility of the dean, director, department head or similar administrator to respond to the allegations and reports of abusive conduct and take corrective action, if appropriate, or to work with Human Resources to develop such a response and corrective action, if appropriate. All complaints and their resolution must be reported to Human Resources.

### **IV. Protection of Rights**

1. Retaliation means conduct that adversely affects another's terms or conditions of employment or education and has the effect of harming a person for filing a complaint or for participating in the investigation. Retaliation can take many forms. Examples include but are not limited to:

- Reassignment of work duties without good reason
- Loss of job benefits (i.e., travel)
- Loss of salary
- Termination
- Threats

Against the Complainant: It is a violation of this policy to retaliate against persons who report or make a charge of abusive conduct or against those who testify, assist, or participate in any investigation involving a complaint. Any such retaliation — or any encouragement of another to retaliate — is a violation of this policy, independent of whether the particular claim is substantiated.

Against the Respondent: Lodging a complaint is not proof of prohibited conduct. A complaint shall not be taken into account during reappointment, tenure, promotion, merit, or other evaluation or review until a final determination has been made that the policy has been violated.

2. Knowingly False or Malicious Complaints:

Accusations of abusive conduct typically have injurious and far-reaching effects on the careers and lives of accused individuals. Therefore allegations must be made in good faith and not out of malice. Knowingly making a false or frivolous allegation will not be tolerated and will subject the person making such a report to disciplinary action.

### **V. Possible Sanctions**

Possible sanctions for a person found to exhibit abusive conduct include but are not limited to the following:

In many situations, the following examples of sanctions may be sufficient

- oral or written reprimand
- required attendance at a sensitivity program
- apology to the victim
- oral or written warning

In certain situations, the following sanctions may also need to be considered.

- loss of salary or benefit, such as sabbatical or research or travel funding
- loss of non-salary benefits (i.e., travel funding)
- demotion
- suspension, probation, termination

While counseling is not considered a sanction, it may be offered or required in combination with sanctions.

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## ***Washington University School of Medicine Guidelines for Professional Conduct in Teacher/Learner Relationships***

### **I. Goals of Policy**

1. To define standards of conduct among all members of the Washington University Medical Center community generally, and specifically within the teacher/learner relationship.
2. To specify a procedure for reporting potential student mistreatment or abuse.
3. To create an administrative mechanism for handling alleged incidents of mistreatment or abuse.
4. To develop a monitoring system to identify individuals or departments whose abusive behavior persists despite intervention.

### **II. Preamble**

The goal of the Washington University Medical Center is to provide patient care, medical education, and biomedical research of the highest quality. Accomplishing this goal depends in part on an atmosphere of mutual respect and collegiality among all those who work here. Disrespectful or abusive conduct of any kind at the Medical Center will not be tolerated. To this end, the School's Committee on the Professional Treatment of Medical Students endorses the Professional Service Commitments outlined by Washington University School of Medicine, as well the standards put forth by the Barnes-Jewish Hospital BJH Cares campaign. These documents address the broad issues of respectful behavior among all members of our Medical Center community. The current document focuses instead on the special issues presented by the teacher/learner relationship, and applies to all years of the medical school curriculum.

Our students are exceptionally talented individuals, dedicated to becoming outstanding physicians, who have selected this medical school for their training. Effective learning is possible only in an environment where students can trust their teachers to treat them fairly and with respect. The teacher may be a faculty member, resident, student, or other member of the health care team. One manner in which the teacher/learner relationship is unique is that students are vulnerable, depending on many of their teachers for evaluations and recommendations. In addition, medical education includes mastering not just pathophysiology but also the essentials of professional behavior. Students learn professional behavior primarily by observing the actions of their teacher role models. Unprofessional, disrespectful or abusive behavior by teachers is antithetical to standards of professional conduct that medical students are expected to master. These behaviors by teachers may also be self-perpetuating, as students come to believe that such behavior is appropriate when they assume the role of teacher.

### **III. Responsibilities of Teachers and Learners**

The teacher-learner relationship confers rights and responsibilities on both parties. Behaving in ways that embody the ideal student-teacher relationship fosters respectful behavior, minimizes the likelihood of student mistreatment or abuse, and optimizes the educational experience for students.

#### **A. Responsibilities of Teachers**

- Be prepared and on time.
- Provide learners with most current materials.
- Treat students fairly, respectfully, and without bias related to their age, race, gender, sexual orientation, disability, religion or national origin.

- Give students timely, constructive and accurate feedback.
- Distinguish between the Socratic method, where insightful questions are a stimulus to learning and discovery, and over-aggressive questioning, where detailed questions are repeatedly presented with the endpoint of embarrassment or humiliation of the student.

### ***B. Responsibilities of Learners***

In all settings:

- Be courteous and respectful of teachers and fellow students regardless of their age, race, gender, sexual orientation, disability, religion or national origin.
- Treat fellow students as colleagues, not competitors.
- Take responsibility for maximizing your educational experience by addressing conflicts and discomforts which may impede your learning.
- Be an enthusiastic learner.
- Be trustworthy and honest.
- Know your limitations and ask for help when needed.

In the clinical setting:

- Put the patients' welfare first.
- Know what's going on with your patients.
- Take the initiative to educate yourself about their illness.
- Put patient welfare ahead of your educational needs.
- Treat all patients and members of the health care team respectfully, regardless of their age, race, gender, sexual orientation, disability, religion or national origin.
- Be compassionate.
- Respect patients' privacy.

## **IV. Unprofessional and Abusive Behaviors**

The responsibilities of teachers and students listed above constitute examples of respectful and professional behaviors. These should be our standards. Some behaviors which fall outside of these guidelines are clearly abusive. More commonly, however, they represent poor judgment, unprofessional behavior or mistreatment. Determining whether a given behavior constitutes abuse or unprofessional behavior is often a matter of perception. It involves a subjective assessment of the intentions of the doer and how the behavior in question was perceived by the recipient. The behaviors listed below in Section A are clearly abusive. Students who feel they may have been abused should discuss the incident or behavior in question with the individuals listed in Section V of this policy. Other disrespectful or unprofessional behaviors, such as (but not limited to) those noted in Section B, may also disrupt the student's educational experience. Students who feel they have been treated in this manner may also discuss the incident or behavior with other students, faculty members or residents, coursemasters, or the individuals listed in Section V of this policy. Students are encouraged to take responsibility for addressing issues which may be detrimental to their educational experience.

### ***A. What is Clearly Student Abuse***

1. Unwanted physical contact (such as hitting, slapping, kicking, pushing) or threats of same.
2. Sexual harassment (see the institution's policy on sexual harassment above).
3. Discrimination based on age, race, gender, sexual orientation, disability, religion or national origin.
4. Requiring students to perform personal chores (i.e., running errands, babysitting, etc).

### ***B. Disrespectful or Unprofessional Behavior***

(This list is not intended to be all-inclusive, but to provide examples of inappropriate behaviors.)

1. Repeated questioning of a student with the primary intent to humiliate or embarrass.
2. Grading based on factors other than performance or merit.
3. Coercing students to do something they find morally objectionable.
4. Public humiliation.
5. Requiring excessive menial, noneducational chores. Work related to the care of patients contributes to the efficient functioning of the team, but must be balanced with educational opportunities.

## **V. What to do if You Believe That You Have Been Abused or Mistreated**

First, carefully examine the circumstances of the incident or incidents which occurred. Discuss the event with someone else who witnessed it, or with another student or individual whose judgment you trust. Do they come under the behaviors listed in Section A above? If so, meet with your coursemaster and describe what happened. If the coursemaster takes action to settle the complaint, he/she will submit a written report of these actions to the Associate Dean for Medical Student Education. If you

are not satisfied with your interaction with the coursemaster, or do not feel comfortable approaching him/her, meet with the Associate Dean for Medical Student Education. The Associate Dean will follow the procedure listed below.

If you determine that you have been treated disrespectfully or in an unprofessional manner, but have not been abused as described in Section A above, it may still be appropriate to pursue your complaint. You may do this by directly approaching the person whom you feel mistreated you, or by seeking assistance from another student, faculty member, resident, the coursemaster, or the Associate Dean for Medical Student Education. The goal of this process is to foster your educational experience by minimizing behaviors which detract from it.

The University will keep confidential all records of complaints, responses and investigations, to the extent permitted by law. Please refer to the University's policy on sexual harassment above for details regarding confidentiality.

## **VI. Procedure for Handling Complaints of Student Abuse**

The Associate Dean for Medical Student Education will be responsible for hearing complaints of student abuse (as described under Section A above) which are not settled at the coursemaster level. (Complaints settled by the coursemaster will also be relayed to the Associate Dean in writing.) He/she will be responsible for reviewing the complaint and obtaining additional information. If the initial review discloses that the complaint warrants further review, he/she will convene an ad hoc committee to hold a hearing. The accused will be notified in writing of the complaint and the policy for handling such complaints, and will be invited to attend the hearing. A confidential copy of the notification will be sent to the accused's department chair (for faculty and residents), training program director (for residents), or the Associate Dean for Student Affairs (for students).

If, however, the initial review discloses that the complaint has no merit, the Associate Dean for Medical Student Education will dismiss it. The student will be notified and may appeal to the Associate Dean for Student Affairs, who will convene an ad hoc committee to address the complaint.

The ad hoc committee will meet to review the facts of the complaint, and may receive written or oral testimony. All materials will be held confidential by the committee. The accused may attend the hearing, and will be provided the opportunity to rebut the complaint. The chair of the ad hoc committee will submit a written report of the committee's findings to the Associate Dean for Medical Student Education. The Associate Dean will notify the accused and the student in writing of the findings. The department chair, program director or Associate Dean for Student Affairs will also be notified (see above), and will be responsible for determining disciplinary actions, which will not be disclosed to the accusing student. The Associate Dean for Medical Student Education will be notified in writing of any disciplinary action taken. Record of the proceedings will be kept by the Associate Dean for Medical Student Education. All complaints of student abuse brought to the Associate Dean will be cross-checked to determine if the accused has been cited previously.

## **VII. Appeals Process**

If the accused is a faculty member and wants to appeal the decision of the ad hoc committee or the disciplinary action of the supervisor, a written appeal may be submitted to the University's Committee on Faculty Rights, which will follow its policy for review. If the accused is a resident physician, a written appeal may be submitted to the Associate Dean for Graduate Medical Education.

If the accused is a student, a written appeal may be submitted to the Dean of the School of Medicine. The Dean or his designate will conduct an appeal review by examining the proceedings of the ad hoc committee as well as any new facts the accused student offers for consideration. The Dean or designate will notify the accused student in writing of his decision. There will be no further appeal.

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## ***Washington University School of Medicine Policy for Students with Disabilities***

It is the goal of Washington University to assist students with disabilities in removing the barriers their disability may pose and provide support in facing the challenge of pursuing an education at Washington University.



Washington University recognizes and accepts its professional, legal and moral responsibility to avoid discrimination in the acceptance and education of qualified students with disabilities and to provide reasonable accommodations to such students consistent with the principles embodied in the law. These guidelines apply to students seeking admittance as well as to those who become disabled while they are enrolled.

Washington University makes every effort to ensure that all qualified applicants and students can participate in and take full advantage of all programs and opportunities offered within the University. Washington University encourages and gives full consideration to all applicants for admission. Washington University does not discriminate in access to its programs and activities on the basis of age, sex, sexual orientation, race, disability, religion, color or national origin. All students in educational programs at the School of Medicine, those seeking admittance, as well as those who become disabled while they are enrolled, must possess those intellectual, ethical, physical and emotional capabilities required to undertake the full curriculum and to achieve the levels of competence required by the faculty and the profession.

In this regard, we will be guided by the principles outlined below.

## **A. Responsibilities of the Student**

### **1. Disclosure of Disability**

It is the responsibility of a student who has a disability to disclose it and request accommodation from the Dean for Student Affairs or Program Director. The School encourages students with disabilities to identify themselves as early as possible in order to optimize the mobilization of resources and available accommodations.

### **2. Diagnosis of Disability**

Students who are in academic difficulty that might be a consequence of a disability are encouraged to avail themselves of diagnostic services that may lead to accommodations. Furthermore, such students are encouraged to explore with the administration of their academic unit the possibility of a disability if the inquiry is relevant to educational performance and there is evidence of educational performance problems.

### **3. Documentation of Disability and Request for Accommodation**

The disability, its functional impact and requested accommodation(s) must be documented. If the student discloses a disability and requests accommodation, the School requires documentation of the disability from a qualified professional. The student is financially responsible, unless there are extraordinary and compelling circumstances, for the costs related to the documentation by an appropriately educated and trained professional. The information provided by the professional must be factual, objective and technically valid, and must establish clearly that the disability substantially limits one or more of the student's major life activities. The professional(s) who evaluate the student should identify options for management of the disability. Based on this information, the affected student then should request in writing the accommodations which he or she requests be made. The Dean for Student Affairs or Program Director and the student should work together to arrive at reasonable accommodations. The School may also require a second expert opinion for which the School may be financially responsible under extraordinary and compelling circumstances. The School reserves the right to request as much detailed information from the student and/or the professional(s) as is necessary to assess the scope of the disability and/or the reasonable accommodations.

## **B. Responsibilities of the School**

### **1. Review of Requests for Accommodation**

Requests for accommodations will usually be reviewed by the Dean for Student Affairs or Program Director. An ad hoc assessment team may be convened which may include the Dean for Student Affairs, the educational Program Director (or curriculum supervisor), selected members of the Disabilities Oversight Committee (See Section B.5 below) and other consultants as appropriate to the individual circumstances. The assessment team usually should include (1) individuals who understand the curriculum in question; (2) a person who is knowledgeable about the Americans with Disabilities Act; (3) a person with authority to authorize accommodations and cause them to be implemented.

### **2. Responsibilities for Accommodation**

The School of Medicine is responsible for the costs incurred in making accommodations which are not unduly burdensome or unreasonable. Accommodations may include but may not be limited to academic modifications which do not fundamentally alter the nature of the program, auxiliary services,

modifications of the circumstances and methods of qualification examinations, classroom modifications and others. The School's responsibility to accommodate ends when a student with a disability (1) refuses reasonable accommodations; (2) is unable, with reasonable accommodations, to fulfill the essential requirements of the program; (3) fulfills the essential requirements and graduates; or (4) transfers to another institution. The School is not required to provide an accommodation which fundamentally alters the nature of the program, is unduly burdensome or is unreasonable.

### 3. Confidentiality

Information pertaining to a student's disability and accommodations will be maintained in a file that is kept confidential and separate from the student's academic record. Appropriate faculty, staff and administrators may be informed regarding the disability, limitations, restrictions and accommodations when they have a need to know such information.

### 4. Application of CAES Policies

The policies and procedures of the School regarding promotion and retention are contained in the CAES Policies for each academic unit. These policies and procedures govern the relationship between the School and all students, including those with disabilities. The School is not obligated to retain a student with a disability who poses a significant threat to the health or safety of others when there is no reasonable accommodation that either eliminates or sufficiently reduces that risk.

### 5. Disabilities Oversight Committee

There shall exist a standing Disabilities Oversight Committee composed of members designated by the Dean of the School of Medicine. The committee shall have the following responsibilities: periodic review of requests for accommodations and accommodations granted, provide recommendations regarding accommodations for disabilities, to serve as requested on disability appeals committee. This group serves as a resource regarding issues of significance to the institution and to students with disabilities.

## C. Appeals

A student with a disability who believes that a request for accommodation has been improperly denied or who perceives that he or she has been discriminated against on the basis of a disability should direct his or her appeal to the Dean of the School of Medicine. As needed, the Dean of the School of Medicine may assemble an advisory group to review appeals and make recommendations. This group may include, but may not be limited to, the following: the chair of the committee that oversees academic evaluation and advancement of students for the particular academic unit, students, and/or representatives of the Disabilities Oversight Committee.

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## ***Student Constitution and Bylaws of the Washington University School of Medicine Medical Student Government***

### **Article I:**

#### ***Name, Purpose, and Membership***

**A.** The name of this organization shall be the Medical Student Government of The Washington University School of Medicine.

**B.** The purpose of the Medical Student Government shall be the advancement of student interests and welfare to achieve excellence in academic pursuits and professional interactions.

**C.** The Medical Student Government shall represent all students pursuing a medical degree who are in good standing with the University.

### **Article II:**

#### ***Class Officers***

**A. Offices:** Each Class shall elect the following officers: President, Medical Education Representative

(MER), Representative to the Organization of Student Representatives (OSR Rep) of the Association of American Medical Colleges (AAMC), Representative to the Graduate-Professional Council (GPC Rep), and a Social Chair/Committee.

**B. Duties:** Each class officer shall have specific responsibilities:

1. President: Each class shall elect one President.

This person shall serve as the official spokesperson for the class in dealings with the Student Government and with the University. The President shall disseminate information regarding medical student affairs and activities. The President shall have oversight and approve of all moneys spent by the Social Chair/Committee. The President shall perform any and all duties that are unique to the class represented.

2. MER: The MER shall represent the class at all meetings of the MERs and Curriculum Evaluation Committee and serve as a liaison between students and faculty on curricular matters. The MER shall poll the class as needed regarding course evaluations and selection of recipients for the various Faculty Awards presented each year.

3. OSR Rep: The OSR Rep shall keep class members up to date with news from the OSR and from the AAMC. The OSR Rep shall represent the University at regional and national meetings of the OSR under an agreement with the University.

4. GPC Rep: The GPC representatives shall represent the School of Medicine at GPC meetings and shall inform the GPC of issues affecting the School of Medicine, learn about issues affecting other schools, discuss and find solutions to problems affecting the whole graduate and professional student population, and plan and advertise social activities that foster communication between all graduate and professional students. The Reps shall be the liaison to the other programs within the School of Medicine, as well as to the rest of the University community. In addition, the four Reps will divide the responsibilities of serving on the Professional and Graduate Students Coordinating Committee (ProGrads), the Medical Campus Committee (temporarily named), and other inter-school/division committees as needed.

5. Social Chair/Committee: The Social Chair/Committee shall organize social functions for class members and interact with other Social Chairs/Committees to organize social functions with other classes and within the University community. The Social Chair/Committee shall consult and obtain approval from the class President for all moneys spent on such functions.

**C. Elections:** An Election Official designated by the Student Government shall be responsible for the organization and execution of all elections held for offices specified under the Constitution, including President, MER, OSR, and GPC. Elections shall be held for each of the class officer positions according to the following format:

1. Voting Eligibility: All students who will be a member of the class during the term for which the elected officers will serve will be eligible to vote in the election. For elections for first- and second-year offices, a member of the class will be considered to be an individual who is currently planning on taking the M.D. course of study for the upcoming year. For elections for third- and fourth-year offices, a member of the class will be considered to be an individual who is planning on taking the M.D. course of study anytime during the upcoming two years, including any individual planning to pursue an M.A. degree for one year during either the third or fourth year of medical school. Efforts should be made by the appointed election official to extend the opportunity to vote to students who will be entering their respective classes in the upcoming year, including but not limited to the large number of M.D./Ph.D. students returning for their clinical clerkships.

2. Nominations: All students who will be a member of the class during the term for which the elected officers will serve, as defined in Article II. C. 1., will be eligible to be nominated for the election. Nominations for each office shall be held starting at least one week prior to the election and ending no later than three days prior to the election. Nominations shall be submitted in writing to the Election Official. Any student eligible to run for office may nominate him/herself or another medical student in good standing. Candidates must have the firm intention of carrying out all the duties and obligations of the office for the entire term.

3. Elections and Terms: All terms shall begin upon election. Regular elections shall be held according to the following schedule:

a. First Year: Elections shall be held within two weeks of the completion of the sixth week of first-semester classes. Each position carries a term of one academic year.

b. Second Year: Elections shall be held within six weeks prior to the completion of the first academic year. Each position carries a term of one academic year.

c. Third and Fourth Year: Elections shall be held within six weeks prior to the completion of the second academic year. Each position carries a term of two academic years.

4. Balloting: To be elected a candidate must receive a simple majority (greater than 50 percent) of the votes cast for that particular office by at least a quorum of one-half of the eligible voters. Write-in candidates shall be allowed on this ballot. Absentee ballots shall be allowed if they are given in writing to the Election Official prior to the day of election. Ballot counting shall be the responsibility of the

Election Official under the observation of a witness agreeable to all candidates.

5. Runoff Procedures: If no candidate receives a simple majority for a particular position, a runoff between the top two candidates shall be held within three days of the initial election. Write-in candidates will not be allowed on this ballot. To be elected a candidate must receive the most votes cast for that particular office by at least a quorum of one-half of the eligible voters.

6. Appeals: All decisions are made by the Election Official during the election period. Appeals may be made by a candidate in writing to the Chair of the Medical Student Government and will be reviewed and ruled on by a group consisting of the current President, MER, OSR, and GPC from each of the four classes; the decisions of this group will be considered final.

7. Vacant Offices: If any office is vacated before its set term, an election will be held for that office using the procedures outlined above within three weeks of the vacancy. If a current class officer runs for the vacated office, that officer must vacate the post he/she occupies.

8. Removal from Office: In the unfortunate event that a class officer is not fulfilling his/her obligations and duties, MSG by a two-thirds majority of a quorum of one-half may vote to recommend that an officer be removed from office to the class that elected the officer. A vote of recall shall then be held within one week. If a three-fourths majority of a quorum of two-thirds of a class votes to recall the officer, the officer shall be removed from office. An election for vacant office shall then be held.

**D. M.D./Ph.D. Research Students:** There shall be a Representative of the M.D./Ph.D. students who are outside the core medical curriculum. This Representative shall be selected by a method chosen by the Medical Scientist Training Program (MSTP.) In addition, this individual shall be a full voting member of the MSG.

**E. Technology Liaison:** The responsibilities of the class appointed Technology Liaison include serving as the representative to the administration regarding the availability and utilization of technology and addressing related class concerns. In addition, the Technology Liaison will work with Instructional Technologies and Library Systems (ITLS) to provide new services and assist the MER with technology-related education initiatives. One Technology Liaison will be appointed for each medical school class after the class-wide elections have taken place. After a call for applications from the class, the four (4) elected MSG members of that class review each application and select the Technology Liaison by consensus. The term of the Technology Liaison will be the same as the elected officials of that class.

## **Article III:**

### ***The Medical Student Government***

**A. Membership:** The Student Government shall consist of the President and the Representative to the Committee on Medical Education from each of the four classes, the Representative of M.D./Ph.D. Students, the Representative to the Graduate Professional Council, and the Representative to the Organization of Student Representatives of the Association of American Medical Colleges from each of the four classes. In addition, the Student Government may offer a non-voting position to a duly elected representative of any student group which is recognized nationally, regionally or within the Medical School so long as such a group is open to all medical students without discrimination and that such a group is not in conflict with the goals of the Student Government.

**B. Purpose and Responsibilities:** The Student Government shall carry out the business of the Student Government pursuant to the goals stated in Article I. The purpose of the Student Government shall be to represent and promote the interests and concerns of the medical student body through activities including but not limited to:

1. Forming and representing official student body opinions for interaction with the University, its Administration and other groups associated with medical education.
2. Serving as a forum for interaction between student groups.
3. Serving as a forum for student-initiated curricular review and reform in the pursuit of academic excellence.
4. Promoting interaction among the School of Medicine students, faculty and administration, and with the wider University community.
5. Establishing a funding mechanism and budget with the associated collection and disbursements of funds for activities pursuant to goals stated in Article I.
6. Organizing elections for class officers and any other official representative of the student body at large.
7. Exercising any such additional authority as may be granted to it by the School of Medicine or by other organizations, so long as such authority is consistent with the purposes stated in Article I.

8. Posting agenda of all meetings for public reference.
9. Formulating all rules and bylaws necessary for the Student Government to carry out the responsibilities and powers granted through this constitution. Such rules and bylaws shall require a simple majority of a quorum of two-thirds of the voting Student Government members.
10. The Student Government shall meet regularly and at intervals of no more than six weeks.
11. Representatives from the various student groups sitting on the Student Government shall keep the Student Government informed of all activities associated with their posts in the form of a written brief to be presented at the Student Government meeting as appropriate for their group's activities.

**C. Student Government Offices:** There shall be a Student Government Chair and Vice-Chair elected from the voting members of the Student Government. Election shall require a simple majority of the voting Student Government. The election shall be held within six weeks prior to the completion of the academic year. The terms of these offices shall be one academic year.

1. Student Government Chair: The Student Government Chair shall preside at all meetings of the Student Government and have specific responsibilities:
  - a. The Chair shall serve as official representative and spokesperson for the Student Government to the University, its Administration, and to other groups associated with medical education.
  - b. The Chair shall be responsible to ensure the duties of the Student Government are carried out efficiently and in a timely manner.
  - c. The Chair shall report the names of the Class Officers to the Dean, and post such a list for public reference.
  - d. The Chair shall be responsible for overseeing and maintaining records and to set the agenda for such meetings in written form for distribution to Student Government members prior to each meeting.
  - e. The MSG shall be responsible for overseeing and maintaining records of all financial transactions of the Student Government. The second-year class president shall regularly update the Student Government on its financial standing, and must make all financial records available to any medical student, member of the Administration, or to any official of the University. All transactions shall require the signatures of the Chair and the Vice-Chair.
  - f. The Chair shall be empowered to call for standing and ad hoc committees to evaluate and make recommendations about specific areas of concern to the Student Government, the School of Medicine and its students. MSG shall appoint these committees.
  - g. The Chair shall be empowered to designate another Student Government member to take on one or more of his/her duties.

## **Article IV:**

### ***Ratification and Amendments***

**A.** In 1993 this Constitution was ratified by a 2/3 majority of a quorum of one-half of the student body pursuing a medical degree.

**B.** This Constitution can be amended by either a 2/3 majority of a quorum of one-half of the students in their first, second, and third years, or by a unanimous vote of the elected members of the Medical Student Government.

### ***Fourth-Year Class Officers***

President  
Ian Dorward

Medical Education Representative (MER)  
Lauren Galpin

Representative to the Organization of Student Representatives (OSR Rep)  
Kristina Toncray

Representative to the Graduate Professional Council (GPC Rep)  
Archit Patel

### ***Third-Year Class Officers***

President  
Tom Shane

Medical Education Representative (MER)  
Gita Mody

Representative to the Organization of Student Representatives (OSR Rep)  
Aaron Robison

Representative to the Graduate Professional Council (GPC Rep)  
Daniel Ma

### ***Second-Year Class Officers***

President  
Derek Williams

Medical Education Representative (MER)  
Jennifer Chu

Representative to the Organization of Student Representatives (OSR Rep)  
Monica Ghei

Representative to the Graduate Professional Council (GPC Rep)  
Anna Terry

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## ***Washington University Medical Campus Policy on HIV and HBV Infection***

In 1992, the Executive Faculty of the School of Medicine formally adopted a medical campus policy on Human Immunodeficiency Virus (HIV) and Hepatitis B virus (HBV) infections. This policy was updated in 2001 to include Hepatitis C virus (HCV) infections. The purpose of the policy is to provide guidelines to prevent or reduce the transmission of these infectious agents between patients and health care workers.

The policy deals with: 1) the University's responsibilities to infected patients (including obligation to treat, confidentiality and appropriate serologic testing), 2) appropriate health and safety precautions and procedures for faculty, students and staff (including compliance with CDC guidelines, blood and body fluid precautions and handling of needles or sharp instruments), and 3) the University's responsibilities to faculty, staff or students who are infected with HIV, HBV, or HCV infection (including admission to medical school, participation in clinical rotations, serologic testing confidentiality and medical treatment).

The policy makes a distinction between class I activities (those involving no risk of transmission from infected health care workers to patients, such as routine physical examinations, dressing changes, intravenous line placement) and class II activities (those that involve the potential for transmission of HIV, HBV, or HCV from infected health care workers to patients, such as invasive surgical procedures in which trauma to a health care worker is possible).

This policy is comprehensive, and a complete copy is available to any interested student through the Office for Student Affairs.

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## ***Technical Standards Statement***

Graduates of Washington University with a Doctor of Medicine degree are expected to have broad competence in the basic skills that underlie the general practice of medicine and surgery. All graduates must be able to take a history, examine a person, synthesize the findings into a diagnosis and plan of evaluation and treatment independently. Thus, medical students must possess the requisite sensory, motor, communicative and cognitive capabilities to accomplish these requirements

in a reliable manner in order to be competent and safe medical practitioners.

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## ***Non-Discrimination Statement***

Washington University encourages and gives full consideration to all applicants for admission, financial aid, and employment. The University does not discriminate in access to, or treatment or employment in, its programs and activities on the basis of race, color, age, religion, sex, sexual orientation, national origin, veteran status, or disability. Present Department of Defense policy governing ROTC and AFROTC programs discriminates on the basis of sexual orientation; such discrimination is inconsistent with Washington University policy. Inquiries about compliance should be addressed to the University's Executive Director of Human Resources, Washington University, Campus Box 1184, One Brookings Drive, St. Louis, MO 63130-4899, (314) 935-5990. The School of Medicine is committed to recruiting, enrolling and educating a diverse student body.

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## ***Student Academic Records and Transcripts***

The Family Educational Rights and Privacy Act of 1974 (FERPA) provides current and former students of the University with specific rights of access to and control over their student record information. In compliance with the statute, appropriate federal regulations, and guidelines recommended by the American Association of University Registrars and Admissions Officers, the University has adopted procedures that implement these rights.

A copy of the University policies regarding educational records and the release of student record information may be obtained from the medical school's Registrar's Office.

Transcript requests may be made in person or by writing to the Registrar's Office. The written request must include your name, signature, date of birth and approximate dates of attendance.

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## ***Voter Registration***

The 1998 Higher Education Act requires all postsecondary institutions to make available voter registration forms to all degree-seeking students.

Voter registration forms will be available at various sites on campus, prior to the next national election on November 2, 2004. Sites on the Medical Campus include the Student Affairs Office, Room 100, McDonnell Sciences Building.

To register to vote in Missouri, you must:

- be a citizen of the United States
- be a resident of Missouri (new residents may register immediately, but proof of residency shall be required.)
- register at least 28 days prior to the election
- be at least 17-1/2 years of age (you must be 18 to vote)
- not be on probation or parole after conviction of a felony, until finally discharged from such probation or parole
- not be convicted of a felony or misdemeanor connected with the right of suffrage
- not be adjudged incapacitated by any court of law
- not be confined under a sentence of imprisonment.

For additional information on voter registration, contact:  
Secretary of State  
Elections Division

James C. Kirkpatrick State Information Center  
P.O. Box 1767  
Jefferson City, MO 65102-1767  
(573) 751-2301 (voice)  
(800) NOW-VOTE (669-8683)  
(573) 526-3242 (Fax)  
<http://www.sos.mo.gov/elections/movote.asp>

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## **Departments**

### **Departments**

#### **Department of Anatomy and Neurobiology**

The structure of the human body is presented in two courses: Gross Anatomy, offered in the first semester, and Microscopic Anatomy, which extends over the first and second semesters. A third course, Neural Sciences, is taught at the end of the second semester. Gross Anatomy is largely a laboratory course, and lectures deal with anatomical principles and human growth and development. Instruction in Microscopic Anatomy focuses on cell and tissue biology, with laboratory sessions paralleling the lectures in these areas. This is a component of the Cell and Organ Systems Biology course jointly taught with the Department of Cell Biology and Physiology. Neural Sciences is an integrated course that deals with the structure, function and development of the nervous system from molecular, cellular and systems perspectives. Throughout all three courses, attention is paid to the results of recent investigations and to major developments in each field. In addition, the departmental faculty have a lead role in many graduate courses that may be taken as electives by students in any of the four years. The department is well-equipped for specialized work in several areas, including gross anatomy, electron microscopy, tissue culture and all aspects of neurobiology.

### **Courses**

#### ***First Year***

##### **M35 554 NEURAL SCIENCES**

Instructors: David C. Van Essen, Ph.D., 362-7043; Timothy E. Holy, Ph.D., co-coursemaster, 362-0086; W. Thomas Thach Jr., M.D., 362-3538

Neural Sciences is an intensive seven-week course that covers the structure, function and development of the nervous system as seen from molecular, cellular and systems-oriented perspectives. The emphasis is on the organization and function of the nervous system in health, but there is frequent reference to the clinical relevance of material presented. The course includes regular lectures, conference sessions and laboratories, plus a number of clinically oriented presentations. Computer-aided instructional programs, accessible from a variety of locations, provide auxiliary modes of self-paced learning and review. The midterm and final emphasize the core body of important facts and principles presented in lectures and laboratories. (SPRING ONLY).

##### **M05 501A HUMAN ANATOMY AND DEVELOPMENT**

Instructor: Glenn C. Conroy, Ph.D., 362-3397

The course is based largely on the dissection of the human body. Lectures on functional and topographic anatomy emphasize the principles of organization of the various systems of the body. Lectures on developmental anatomy stress organogenesis as an adjunct to understanding the normal and abnormal anatomy. An extensive museum of labeled dissected specimens is housed in the dissecting room for ready reference by students who encounter abnormalities or variations in their dissections. Frequent use of CT and MRI scans, radiographs and cross-sections aid in the synthesis of knowledge gained through dissection into clinically useful information. Radiologic anatomy and clinical correlation conferences further aid in this process. Cross-listed with L41 (Bio) 501.

##### **M75 503 CELL AND ORGAN SYSTEMS BIOLOGY**

Instructor: Paul C. Bridgman, Ph.D., 362-3449

The structure of cells, tissues and organs is studied with regard to the functional significance of the morphological features. The laboratories consist of the study of prepared slides and electron micrographs. A microscope will be provided for each student. Limited space is available for non-medical students with instructor's permission. This course is cross-listed in Department of Cell Biology and Physiology.

### **Selectives**

##### **M04 552 GENETICS AND MOLECULAR BIOLOGY OF ION CHANNELS**

Instructor: Lawrence B. Salkoff, Ph.D., 362-3644

A functional genomics approach to studying membrane excitability. How the new DNA sequence data from genomic and EST sequencing projects can be exploited to get a comprehensive picture of gene families that contribute to membrane excitability. How DNA sequence data can contribute to understanding questions of physiology, development, regulation and structure-function relationships.

## **Fourth Year**

### **Electives**

The department offers a number of graduate-level courses that may be taken as electives by medical students. The department participates in the Division of Biology and Biomedical Sciences, which also offers courses relevant to anatomy and neurobiology.

These course descriptions are presented in the section on Biology and Biomedical Sciences.

L41 (Bio) 5571 CELLULAR NEUROBIOLOGY  
L41 (Bio) 5641 COMPUTATIONAL NEUROSCIENCE  
L41 (Bio) 5651 NEURAL SYSTEMS  
L41 (Bio) 567 ADVANCED TUTORIALS IN NEURAL SCIENCE  
L41 (Bio) 590 RESEARCH OPPORTUNITIES

*Note -- The number preceding the course title indicates that the course is offered by the Division of Biology and Biomedical Sciences and carries credit in the Graduate School of Arts and Sciences.*

#### **M05 810 ADVANCED DISSECTION**

Instructor(s): Staff, 362-3397

Location: North Building

Elective Contact: Glenn Conroy, Ph.D., 362-3397

Other Information: Self Study Pass/Fail. Contact Dr. Conroy one week prior to the start of the elective.

Enrollment limit per period: 14

Valid start weeks for 4-week blocks are: Weeks 29, 33, 37, and 41.

Different regions of the body will be dissected in detail. A period of four weeks should be allowed for each region: head and neck, thorax and abdomen, and superior and inferior limbs. Surgical approaches, cross-sections, X-rays and CT scans can be studied.

Student time distribution: A minimum of 40 hours is required

Major teaching responsibility: N/A

Patients seen/weekly: N/A

On call/weekend responsibility: N/A

#### **M05 820 TEACHING ASSISTANT IN HUMAN ANATOMY**

Instructor(s): Glenn Conroy, Ph.D., 362-3397

Location: North Building

Elective Contact: Glenn Conroy, Ph.D., 362-3397

Other Information: Pass/Fail. Students should contact Dr. Conroy one week prior to the start of the elective.

Enrollment limit per period: 4

Valid start weeks for 4-week blocks are: Weeks 13, 17, and 21.

Offers the student the opportunity to review human anatomy by assisting the Anatomy faculty in teaching first-year medical students in the Anatomy laboratory.

Student time distribution: N/A

Major teaching responsibility: N/A

Patients seen/weekly: N/A

On call/weekend responsibility: N/A

### **Research**

#### **(M05 900)**

## **Cross-listed with L41 (Bio) 590**

Charles H. Anderson, Ph.D., 2nd Floor East McDonnell, 362-1799. Computational models of neural systems.

Dora Angelaki, Ph.D., 2nd Floor East McDonnell, 747-5529. Neural basis of motion perception and spatial orientation. Neural control of eye and head movements.

Nancy L. Baenziger, Ph.D., 9th Floor McDonnell Science Building, 362-2817. Environmental stress impact on receptor signal transduction and neuronal connectivity in cellular models of Alzheimer's disease.

Paul Bridgman, Ph.D., 4th Floor McDonnell Science Building, 362-3449. Cell biology of the developing nervous system.

Andreas Burkhalter, Ph.D., 4th Floor North Building, 362-4068. Development and synaptic organization of cortical circuits.

Harold Burton, Ph.D., 3rd Floor East McDonnell, 362-3556. Cortical functional reorganization in sighted and blind people.

James M. Cheverud, Ph.D., 3rd Floor North Building, 362-4188. Evolutionary quantitative genetics, genetics of growth and morphology, gene mapping for obesity and diabetes-related traits in mice.

Glenn C. Conroy, Ph.D., 3rd Floor North Building, 362-3397. Comparative primate anatomy and human evolution.

Ann Marie Craig, Ph.D., 9th Floor McDonnell Science Building, 362-0660. Molecular and cellular mechanisms of central neuron synapse formation.

Gregory DeAngelis, Ph.D., 3rd Floor East McDonnell, 747-2253. Neural circuits underlying three-dimensional vision and object representation.

David I. Gottlieb, Ph.D., 9th Floor McDonnell Science Building, 362-2758. Embryonic stem cell models of neural development and disease.

Timothy E. Holy, Ph.D., 4th Floor North Building, 362-0086. Neural mechanisms of the detection and recognition of pheromones.

Arthur D. Loewy, Ph.D., 9th Floor McDonnell Science Building, 362-3930. CNS autonomic regulation; viral tracers for defining central circuits.

Michael L. Nonet, Ph.D., 9th Floor McDonnell Science Building, 747-1176. Molecular genetic analysis of synaptic development and function in the nematode *C. elegans*.

Karen L. O'Malley, Ph.D., 9th Floor McDonnell Science Building, 362-7087. Molecular biology of dopaminergic systems. Mechanisms underlying the specification, regulation and neurodegeneration of dopaminergic systems.

Jane Phillips-Conroy, Ph.D., 3rd Floor North Building, 362-3396. Behavior, morphology and biology of living primate populations.

Joseph L. Price, Ph.D., 4th Floor North Building, 362-3587. Structure and organization of the prefrontal cortex and limbic forebrain, and the neuropathology of mood disorders and Alzheimer's disease.

Yi Rao, Ph.D., 9th Floor McDonnell Science Building, 362-9388. Molecular mechanism of axon guidance and neuronal migration.

Lawrence B. Salkoff, Ph.D., 9th Floor McDonnell Science Building, 362-3644. Genetics and molecular biology of ion channels.

Paul J. Shaw, Ph.D., 9th Floor McDonnell Science Building, 362-2703. Molecular genetics of sleep and circadian rhythms.

Lawrence H. Snyder, M.D., Ph.D., 3rd Floor East McDonnell, 747-3530. Computational and cognitive

issues in cortical control of eye and arm movement.

Paul H. Taghert, Ph.D., 9th Floor McDonnell Science Building, 362-3641. Mechanisms of circadian clock output. Development of neurotransmitter properties.

W. Thomas Thach, M.D., 2nd Floor East McDonnell, 362-3538. Neural control of posture, movement and motor learning; cognitive functions of the cerebellum.

David C. Van Essen, Ph.D., 2nd Floor East McDonnell, 362-7043. Organization and function of cerebral cortex in general and primate visual cortex in particular.

Rachel O. Wong, Ph.D., 4th Floor McDonnell Science Building, 362-4941. Development of neuronal connectivity in the central nervous system.

## **Department's Website**

<http://thalamus.wustl.edu>

## **Faculty**

**CHARLES H ANDERSON, PHD** Research Professor of Neurobiology

**DORA ANGELAKI, PHD** Professor of Neurobiology

**NANCY L BAENZIGER, PHD** Research Associate Professor of Neurobiology

**RICHARD A. BAIRD, PHD** Research Associate Professor of Neurobiology

**PAUL C BRIDGMAN, PHD** Associate Professor of Neurobiology

**ESTELLE BRODMAN, PHD, BS** Professor Emerita of Medical History in Anatomy

**RANDY L. BUCKNER, PHD, PHD, MA** Associate Professor of Neurobiology

**ANDREAS H BURKHALTER, PHD** Professor of Neurobiology

**HAROLD BURTON, PHD** Professor of Neurobiology

**JAMES M CHEVERUD, PHD** Professor of Anatomy

**THEODORE J CICERO, PHD** Professor of Neurobiology

**GLENN C CONROY, PHD** Professor of Anatomy

**MAURIZIO CORBETTA, MD** Associate Professor of Neurobiology

**ANN MARIE CRAIG, PHD** Associate Professor of Neurobiology

**JOHN G CSERNANSKY, MD** Associate Professor of Neurobiology

**GREGORY C DEANGELIS, PHD** Assistant Professor of Neurobiology

**J. DAVID DICKMAN, PHD** Research Associate Professor of Otolaryngology

**KRIKOR T DIKRANIAN, MD, PHD** Instructor in Anatomy

**LAURA DUGAN, MD** Associate Professor of Neurobiology

**SUSAN M FITZPATRICK, PHD** Adjunct Assistant Professor of Neurobiology

**JAMES E. GALVIN, MD** Assistant Professor of Neurobiology

**ROBERT W GEREAU, PHD** Associate Professor of Neurobiology

**MARK PAUL GOLDBERG, MD** Professor of Neurobiology

**URSULA W. GOODENOUGH, PHD** Associate Professor of Anatomy

**DAVID I GOTTLIEB, PHD** Professor of Neurobiology

**M. ROSARIO HERNANDEZNEUFELD, DDENT** Associate Professor of Neurobiology

**STEPHEN M HIGHSTEIN, MD, PHD** Professor of Neurobiology

**TIMOTHY E. HOLY, PHD** Assistant Professor of Neurobiology

**ROBYN SUE KLEIN, MD** Assistant Professor of Neurobiology

**JEFF W LICHTMAN, MD, PHD** Adjunct Professor of Neurobiology  
**CHRISTOPHER J LINGLE, PHD** Professor of Neurobiology  
**ARTHUR D LOEWY, PHD** Professor of Anatomy and Neurobiology  
**PETER DAVID LUKASIEWICZ, PHD** Associate Professor of Neurobiology  
**JOHN WOOD MCDONALD, III, MD, PHD** Associate Professor of Neurobiology  
**STEVEN JAMES MENNERICK, PHD** Assistant Professor of Neurobiology  
**DAVID NORMAN MENTON, PHD** Lecturer in Anatomy, Associate Professor Emeritus Of Anatomy  
**DANIEL MORAN, PHD** Assistant Professor of Neurobiology  
**JEFFREY J NEIL, MD, PHD** Assistant Professor of Neurobiology  
**BRUCE L NOCK, PHD** Associate Professor of Neurobiology  
**MICHAEL L NONET, PHD** Associate Professor of Neurobiology  
**KAREN LAUREL OMALLEY, PHD** Professor of Neurobiology  
**TAE SUNG PARK, MD** Professor of Neurobiology  
**JOEL S PERLMUTTER, MD** Associate Professor of Neurobiology  
**STEVEN E PETERSEN, PHD** Professor of Neurobiology  
**ROY R PETERSON, PHD** Professor Emeritus of Anatomy  
**JANE PHILLIPS CONROY, PHD** Professor of Anatomy  
**JOSEPH L PRICE, PHD, BA** Professor of Anatomy and Neurobiology  
**MARCUS E RAICHLE, MD** Professor of Neurobiology  
**YI RAO, PHD** Associate Professor of Neurobiology  
**KEITH M RICH, MD** Associate Professor of Neurobiology  
**CARMELO ROMANO, PHD** Assistant Professor of Neurobiology  
**STEVEN MARK ROTHMAN, MD** Professor of Neurobiology  
**JOSHUA BENNETT RUBIN, MD, PHD** Assistant Professor of Neurobiology  
**LAWRENCE B SALKOFF, PHD** Professor of Neurobiology  
**JOSHUA R SANES, PHD** Adjunct Professor of Neurobiology  
**BRADLEY L SCHLAGGAR, MD, PHD** Assistant Professor of Neurobiology  
**PAUL JOSEPH SHAW, PHD** Assistant Professor of Neurobiology  
**DWAYNE DEANGELO SIMMONS, PHD** Research Associate Professor of Otolaryngology  
**ROBERT J SINCLAIR, PHD** Research Assistant Professor of Neurobiology  
**LAWRENCE H SNYDER, MD, PHD** Associate Professor of Neurobiology  
**JOSEPH H STEINBACH, PHD** Professor of Neurobiology  
**PAUL H TAGHERT, PHD** Professor of Neurobiology  
**W. THOMAS THACH, MD** Professor of Neurobiology  
**KURT A THOROUGHMAN, PHD** Assistant Professor of Neurobiology  
**ROBERT LAWRENCE TYCHSEN, MD** Associate Professor of Neurobiology  
**DAVID C VAN ESSEN, PHD** Head of The Department of Anatomy and Neurobiology, Edison Professor of Neurobiology  
**MIA C WALLACE** Research Scientist of Neurobiology  
**MARK EDWARD WARCHOL, PHD** Research Assistant Professor of Otolaryngology  
**AGUAN D WEI, PHD** Research Assistant Professor of Neurobiology  
**RALF WESSEL, PHD** Assistant Professor of Neurobiology  
**MARK B WILLARD, PHD** Professor of Neurobiology  
**RACHEL OI WONG, PHD** Professor of Neurobiology  
**THOMAS A WOOLSEY, MD** Professor of Anatomy and Neurobiology

## **Department of Anesthesiology**

Anesthesiology is a medical specialty encompassing a broad range of medical and scientific activities. The clinical practice of anesthesiology includes: 1) assessment of, consultation for and preparation of patients for anesthesia; 2) provision of insensibility to pain during surgical, obstetric, therapeutic and diagnostic procedures; 3) monitoring and restoration of physiologic homeostasis during the perioperative period, as well as homeostasis in the critically ill or seriously injured patient; 4) diagnosis and treatment of painful syndromes; and 5) clinical management and teaching of cardiopulmonary resuscitation (CPR). The realm of scientific investigation in anesthesiology also spans a broad range. Scientific efforts at the cellular and molecular levels are directed to understanding the molecular mechanisms of anesthesia and analgesia. Clinical research in anesthesia includes broad epidemiological approaches to identifying indicators of outcome as well as prospective clinical studies examining new technologies, anesthetic agents and methods.

The Department of Anesthesiology presents the student with the opportunity to: 1) acquire and apply pharmacologic knowledge related to anesthetic, narcotic, paralytic and sedative drugs and to drugs affecting the autonomic nervous system; 2) understand and apply the basic principles of airway management and mechanical ventilation; 3) understand and apply the principles of cardiopulmonary resuscitation; 4) understand and apply the technical skills and anatomic and pharmacologic knowledge used in performing regional nerve blocks; 5) learn and apply the fundamental principles of acute and chronic pain management; and 6) learn and apply the basic principles of critical care medicine.

Anesthesiology bridges the gap between basic science and clinical medicine. It provides experience in the clinical evaluation and management of patients, and in applied physiology and pharmacology. The Department of Anesthesiology offers student experiences in the operating room, the intensive care unit, the pain clinic and the laboratory.

This clerkship introduces all of the basic aspects of anesthetic practice, including preoperative assessment, intraoperative anesthetic administration, placement and interpretation of invasive and non-invasive physiologic monitoring, airway management and regional anesthetic administration. Students taking this clerkship work one-on-one with attending anesthesiologists and are an integral part of the anesthetic care team. By the end of the clerkship, the student should be able to provide (under supervision) anesthesia for an uncomplicated surgical procedure. This rotation offers a unique opportunity for the student to work directly with attending physicians and to acquire fundamental skills (airway management, invasive monitoring, regional anesthesia) applicable to all aspects of acute medicine.

Students who have taken the anesthesia clerkship in the third year may elect to repeat this rotation in the fourth year. These students will be exposed to more complicated cases and techniques, and will be given increased responsibility for perioperative patient management. Students who have taken the clerkship in the third year also may elect to take an elective in the subspecialty areas of Cardiothoracic Anesthesiology, Pediatric Anesthesiology or Anesthesia for Neurosurgery. Students taking these electives will be exposed to surgical cases of increased complexity requiring specialized invasive monitoring and anesthetic techniques.

A four-week elective also is offered in critical care medicine that is designed to familiarize the student with the diagnosis and treatment of the critically ill surgical patient. This is accomplished by the student becoming an integral part of the intensive care team. Students learn techniques of mechanical ventilation, hemodynamic monitoring, resuscitation and vasoactive drug treatment while managing all aspects of patients assigned to their care.

The clerkship in pain management offers the student the opportunity to participate in comprehensive, multidisciplinary management of acute, chronic and cancer pain problems. Students will be expected to assist in the care of both inpatients and outpatients. Students will learn fundamental aspects of pain management, which should provide the knowledge with which to manage routine acute and cancer pain in their subsequent practice.

Special electives in basic science research as it applies to anesthesiology can be arranged with the principal investigators in the Anesthesiology Research Unit, under the direction of Joe Henry Steinbach, Ph.D. These laboratories focus on various aspects of molecular neurobiology, including ion channel structure and function, G-protein molecular biology, molecular mechanisms of volatile

anesthetic action and genetics of anesthetic responsiveness. Arrangements for these special electives are made through the specific investigators: Walter A. Boyle III, M.D.; Zhou-Feng Chen, Ph.D.; C. Michael Crowder, M.D., Ph.D.; Alex S. Evers, M.D.; Narasimhan Gautam, Ph.D.; Richard S. Hotchkiss, M.D.; Christopher J. Lingle, Ph.D.; Joseph H. Steinbach, Ph.D.; or Robert W. Gereau, Ph.D.

## **Courses**

### ***Fourth Year***

#### **Electives**

##### **M10 805 ANESTHESIOLOGY**

Instructor(s): Joseph Kras, MD., 747-0300

Location: Barnes-Jewish Hospital, South Campus

Elective Contact: Gerri Neumann, 362-4449

Other Information: Please contact the department student secretary, Gerri Neumann, at 362-4449 prior to the elective for specific instructions. Students should meet in the Clinical Simulation Center, 3rd floor Barnes-Jewish Hospital Service Building, 8:30 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This clinical elective is designed to familiarize the student with basic aspects of anesthesiology practice. The primary teaching method is patient care in an instructional setting (one-on-one). The student will learn the basics of preoperative evaluation of surgical patients, preanesthetic medication, intraoperative patient management and intraoperative monitoring. The student will be taught practical perioperative fluid and electrolyte therapy, airway management skills, the placement and interpretation of invasive monitoring devices, and regional anesthetic techniques. The student will be an integral part of the anesthesia care team and will participate actively in the anesthetic management of surgical patients. The rotation will also include practical management of some common medical and surgical emergencies using a clinical simulator. By the end of the rotation, we expect that the student will independently (under supervision) provide anesthesia for uncomplicated surgical procedures.

Student time distribution: Inpatient 85%, Conferences/Lectures 15%; Subspecialty Care 100%

Major teaching responsibility: Single attending and/or Resident

Patients seen/weekly: 15

On call/weekend responsibility: One Saturday morning

##### **M10 811 CARDIOTHORACIC ANESTHESIOLOGY**

Instructor(s): Charles W. Hogue, Jr., M.D., 362-6584

Location: Barnes-Jewish Hospital, South Campus

Elective Contact: Sandy Hawes, 362-1196

Other Information: Students should meet at the offices of the Division of Cardiothoracic Anesthesia, 3rd Floor Barnes-Jewish Service Building, 6:30 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This clinical elective offers practical experience in the perioperative assessment and management of surgical patients undergoing cardiothoracic procedures. The student, as part of the cardiothoracic anesthesia team composed of faculty members, fellows and residents, will learn basic principles of airway management and lung ventilation, essential aspects of pharmacologic treatment of hemodynamic abnormalities and cardiac dysrhythmias, and management of intraoperative coagulation disturbances. Emphasis will be placed on the interpretation of intraoperative hemodynamic data, echocardiographic finding (TEE), and laboratory results in clinical decision making and treatment approach during anesthesia and surgery. During this rotation, the student will also gain practical experience in endotracheal intubation and the placement of intravenous lines, and invasive monitoring lines, including radial artery and pulmonary artery catheters. At the conclusion of the rotation, the student will have a better understanding of invasive monitoring and data interpretation, as well as a more systematic approach to the management of intra- and post-operative hemodynamic, pulmonary and coagulation abnormalities. The students are expected to attend the didactic sessions of CTA and

the Department of Anesthesiology. A presentation or paper will be assigned.  
Student time distribution: Inpatient 100%; Subspecialty Care 100%  
Major teaching responsibility: Charles W. Hogue, Jr., M.D.  
Patients seen/weekly: 15  
On call/weekend responsibility: None

#### M10 812 PEDIATRIC ANESTHESIA

Instructor(s): Gary Hirshberg, M.D.; David Moore, M.D.; and David Murray, M.D., 454-6215  
Location: 5th Floor, St. Louis Children's Hospital  
Elective Contact: David Moore, M.D., 454-6215  
Other Information: Students should contact Martha Severn, 454-6215, one week prior to commencing elective.

Enrollment limit per period: 2  
Valid start weeks for 4-week blocks are: Weeks 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This clinical elective is designed to teach the theory and practice of pediatric anesthesiology and pain management. It features individualized instruction with faculty who specialize in the perioperative care of pediatric patients. The elective consists of three weeks of active participation with pediatric anesthesiologists at St. Louis Children's Hospital and Shriners Hospital for Children learning preanesthetic assessment, the performance of routine anesthetics (which includes instruction and practice in pediatric airway skills), and the management of post-anesthesia care and pain therapies. The final week is tailored to meet the student's individual needs and career goals. Possibilities include exposure to sedation and anesthesia for procedures outside of the operating rooms, and to subspecialties including cardiovascular anesthesia, neurosurgical anesthesia, and acute and chronic pediatric pain management. Students also will have an opportunity to learn the management of some common medical emergencies in the Clinical Simulation Center.

Student time distribution: Inpatient 10%, Outpatient 80%, Conferences/ Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attending, fellows; students will generally spend most of each day with a single attending

Patients seen/weekly: 25  
On call/weekend responsibility: None

#### M10 819 CARDIOTHORACIC CRITICAL CARE

Instructor(s): Eric Jacobsohn, M.D.; Laureen Hill, M.D.; and Charl De Wet, M.D.; Michael Avidan, M.D.; and Nat Levy, M.D.

Location: Barnes-Jewish Hospital, South Campus

Elective Contact: Maureen Arends, 747-4155

Other Information: Students should meet in the cardiothoracic intensive care unit, 2300 ICU, 2nd Floor Barnes-Jewish Service Building, 7:30 a.m. first day of elective.

Enrollment limit per period: 2  
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This clinical elective offers practical experience in the postoperative management of cardiothoracic patients. The student will be fully integrated into the intensive care team and have the opportunity to contribute to the management of critically ill patients. Students will be afforded the opportunity to follow specific patients over the course of their stay on the ICU, during which time they will gain insight into holistic management of patients with multi-organ dysfunction. The CTICU environment is both challenging and exciting. Cardiorespiratory physiology and pharmacology will be demonstrated at the patients' bedside, an invaluable and unforgettable learning experience. Students will have numerous opportunities to assist with and learn procedures, such as central lines, chest tubes, bronchoscopy and pulmonary artery catheter insertion. Principles of management and resuscitation of hemodynamically unstable patients following surgery will be emphasized. At the conclusion of the rotation, the student will have a better understanding of shock, sepsis, multi-organ failure, organ system support and compassionate withdrawal of life support. An exciting teaching program will be prepared for the students. Students will be encouraged to present on their patient at morning ward rounds, during which constructive feedback and interactive teaching will occur. Students will present on a topic related to one of their patients at the end of the block.

Student time distribution: Inpatient 100%; Subspecialty Care 100%

Major teaching responsibility: Eric Jacobsohn, M.D.

Patients seen/weekly: 15



On call/weekend responsibility: None

#### M10 820 CRITICAL CARE

Instructor(s): Walter Boyle, M.D., 747-3581, Course master;  
Timothy Buchman, Ph.D., M.D.; J. Perren Cobb, M.D.; Craig Coopersmith, M.D.; Alex Evers, M.D.; Eric Jacobsohn, M.D.; Lauren Hill, M.D.; Richard Hotchkiss, M.D.; George Tseng, M.D.; Omokhayo Higo, M.D.; John Mazuski, M.D.; and Doug Schuerer, M.D.

Location: Barnes-Jewish Hospital, South Campus

Elective Contact: Vickie Kamp, 747-3581

Other Information: Students should meet in Surgical Intensive Care Unit, 7:00 a.m. first day of elective.

Enrollment limit per period: 4

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This clinical elective is designated to familiarize the student with the management of the critically ill patient. The setting is the 8400 surgical intensive care unit at Barnes-Jewish Hospital. The student will receive individualized training in critical care management including stabilization of the critically ill or injured patient, cardiovascular assessment and invasive hemodynamic monitoring, management of the airway and mechanical ventilator support, and other aggressive support as needed. The student will function as an integral member of the surgical intensive care unit team, which consists of physicians with specialty training in critical care, critical care fellows, house staff from surgery, anesthesiology, and other specialties, pharmacists, and nutrition experts. The student will actively participate in daily rounds with members of the team and will be actively involved in the management of critically ill patients from all the surgical specialties except cardiothoracic and neurosurgery. Practical experience will be gained in placement and interpretation of invasive and non-invasive cardiovascular monitors, the recognition and treatment of shock syndromes including trauma and burns, airway management and the use of mechanical ventilation, the diagnosis and treatment of renal insufficiency, management and treatment of infectious problems including septic shock, management of fluids and electrolytes, and nutrition.

Student time distribution: Inpatient 80%, Conferences/Lectures 20%; Subspecialty Care 100%

Major teaching responsibility: Attendings

Patients seen/weekly: 50

On call/weekend responsibility: Variable

#### M10 821 PAIN MANAGEMENT

Instructor(s): Robert A. Swarm, M.D., 747-0101

Location: Barnes-Jewish Hospital, South Campus

Elective Contact: Robert A. Swarm, M.D., 747-0101

Other Information: Students should report to 10th Floor CAM Building, 8:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Severe, uncontrolled pain is an all-too-often consequence of acute or chronic illness. Pain management students will be involved in the multidisciplinary management of acute and chronic pain, and master the treatment guidelines with which greater than 90 percent of cancer patients' pain can be successfully managed. This rotation is centered at Barnes-Jewish Hospital, but students also may be involved with patient care at St. Louis Children's Hospital

Student time distribution: Inpatient 30%, Outpatient 60%, Conferences/ Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attendings

Patients seen/weekly: 70

On call/weekend responsibility: One weekend per rotation

#### M10 822 ANESTHESIA FOR NEUROSURGERY

Instructor(s): René Tempelhoff, M.D., and Mary Ann Cheng, M.D., 362-2330

Location: Barnes-Jewish Hospital, South Campus

Elective Contact: René Tempelhoff, M.D., 362-2330

Other Information: Students should meet on 3rd Floor Barnes-Jewish Hospital, South Campus, Department of Anesthesiology, 7:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Challenging neurosurgical procedures. Student will become familiar with complex procedures for brain monitoring, cardiovascular support and airway management and will be exposed to all kinds of neurosurgical ailments.

Student time distribution: Inpatient 80%, Conferences/Lectures 20%; Subspecialty Care 100%

Major teaching responsibility: Attending

Patients seen/weekly: 8

On call/weekend responsibility: None

#### **M10 823 OBSTETRICAL ANESTHESIA**

Instructor(s): Laila Bottros, M.D., 362-1374

Location: Barnes-Jewish Hospital, South Campus

Elective Contact: Laila Bottros, M.D., 362-1374

Other Information: Students should meet on 5400 Labor and Delivery, 7:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 2 or 4-week blocks are: Weeks 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, and 43.

The medical students will learn the different analgesia/anesthetic options for the labor patient. They will also learn how the physiological adaptations of pregnancy influence anesthetic management. They will be actively involved in the parturient's management, i.e. starting an IV, placement of spinal, epidural or CSE (combined spinal epidural) anesthetics. They will also attend the OB anesthesia conferences and interview patients in labor (with an OB anesthesia attending).

Student time distribution: Inpatient 90%, Conferences/Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attending, Senior Resident

Patients seen/weekly: 20

On call/weekend responsibility: None (optional)

## **Faculty**

**ALEX S EVERS, MD** Head of The Department of Anesthesiology, Henry E Mallinckrodt Professor of Anesthesiology

**NABIL ABOUD, MD** Associate Professor of Anesthesiology

**SIRAJUDDIN AGHA, MBBS** Assistant Professor of Anesthesiology

**GUSTAV AKK, PHD** Research Assistant Professor of Anesthesiology

**MICHAEL J ANDRITSOS** Instructor in Anesthesiology

**SHARMA ANSHUMAN, MD** Assistant Professor of Anesthesiology

**MICHAEL SIMON AVIDAN, MBBCH** Assistant Professor of Anesthesiology

**INAKI AZPIAZU, PHD** Research Instructor in Anesthesiology

**BRAD BERNSTEIN, MD** Instructor in Anesthesiology

**MATTHEW S BODNER, MD** Assistant Professor of Anesthesiology

**JAN H BOON, MBBCH** Instructor in Anesthesiology

**LAILA M BOTTROS, MD** Assistant Professor of Anesthesiology

**WALTER A BOYLE, III, MD** Associate Professor of Anesthesiology

**TIMOTHY G BUCHMAN, MD, PHD** Professor of Anesthesiology

**LAURA FRANCESCA CAVALLONE, MD** Instructor in Anesthesiology

**ZHOUFENG CHEN, PHD** Assistant Professor of Anesthesiology

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**JENNIFER W COLE, MD** Associate Professor of Anesthesiology

**MICHAEL T CONNOR, MD** Instructor in Anesthesiology  
**CRAIG M COOPERSMITH, MD** Associate Professor of Anesthesiology  
**THOMAS E COX, MD** Assistant Professor of Anesthesiology  
**CHARLES M CROWDER, MD, PHD** Associate Professor of Anesthesiology  
**PRITI DALAL, MBBS** Instructor in Anesthesiology  
**BAKUL DAVE, MD, MD** Assistant Professor of Anesthesiology  
**VICTOR G DAVILA-ROMAN, MD** Associate Professor of Anesthesiology  
**THOMAS ALLEN DAVIS, MD** Associate Professor of Anesthesiology  
**CHARL JOHAN DE WET, MBCHB** Assistant Professor of Anesthesiology  
**SEEMA DESHPANDE, MD** Instructor in Anesthesiology  
**GEORGE J DESPOTIS, MD** Associate Professor of Anesthesiology  
**MICHAEL N DIRINGER, MD** Professor of Anesthesiology  
**JAMES J FEHR, III, MD** Assistant Professor of Anesthesiology  
**BEVERLY J FIELD, PHD, BA** Instructor in Anesthesiology  
**ROBERT M FORSTOT, MD** Instructor in Clinical Anesthesiology  
**KIMIKO FUKUI, MD** Instructor in Anesthesiology  
**PRABHU REDDY GALIVETI, MBBS** Instructor in Anesthesiology  
**NARASIMHAN GAUTAM, PHD** Professor of Anesthesiology  
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**CHARLES B HANTLER, MD** Professor of Anesthesiology  
**ROBERT E HEROLD, MD** Assistant Professor of Anesthesiology  
**OMOKHAYE M HIGO, MBBS** Assistant Professor of Anesthesiology  
**LAUREEN L HILL, MD** Associate Professor of Anesthesiology  
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**CHARLES W HOGUE, JR, MD** Associate Professor of Anesthesiology  
**BARBEL HOLTMANN, MD, BS** Associate Professor of Anesthesiology  
**RICHARD S HOTCHKISS, MD** Professor of Anesthesiology  
**HAWPENG STEPHEN HSU, MD** Assistant Professor of Anesthesiology  
**HUI JUAN HU, PHD** Research Instructor in Anesthesiology  
**CATHERINE IFUNE, MD, PHD** Assistant Professor of Anesthesiology  
**SELMA E.H.O. ISHAG, MD, PHD** Instructor in Anesthesiology  
**ERIC JACOBSON, MD** Associate Professor of Anesthesiology  
**JAMES JAY JENKINS, MD** Associate Professor of Anesthesiology  
**MATTHEW B JONES, MD** Assistant Professor of Anesthesiology  
**IVAN M KANGRGA, MD, PHD** Assistant Professor of Anesthesiology  
**FARZANA KARIM, PHD** Research Instructor in Anesthesiology  
**SHAHRDAD KHODAMORADI, MD** Assistant Professor of Anesthesiology

**TESSA MARIE KING, MD** Instructor in Anesthesiology

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**CATHERINE P KRUCYLAK, MD** Assistant Professor of Anesthesiology

**ANAND LAKSHMINARASIMHACHAR, MBBS** Instructor in Anesthesiology

**VENKATA LAKSHMA LANKA, MBBS** Instructor in Anesthesiology

**DEMETRIOS G LAPPAS, MD, PHD** Professor Emeritus of Anesthesiology

**CHRIS CHENG-FU LEE, MD** Instructor in Anesthesiology

**BARBARA L. LEIGHTON, MD** Professor of Anesthesiology

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**DAVID J MURRAY, MD** Professor of Anesthesiology

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**JOAN M NIEHOFF, MD** Assistant Professor of Anesthesiology

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**RAHUL RASTOGI, MBBS** Instructor in Anesthesiology

**JEBADURAI RATNARAJ, MD** Instructor in Anesthesiology

**NECITA L ROA, MD** Associate Professor of Anesthesiology

**FRANK EDWARD ROBBINS, MD** Assistant Professor of Anesthesiology

**ALBERT ROOS, MD** Professor Emeritus of Cell Biology and Physiology

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**BRETT D WOLFF, MD** Assistant Professor of Anesthesiology  
**XIAOMING XIA, PHD** Research Assistant Professor of Anesthesiology  
**JULIAN YEPES, MD** Assistant Professor of Anesthesiology  
**XIAOBIN YI, MD** Instructor in Anesthesiology  
**ALEXANDER H YOUNG, MD** Instructor in Anesthesiology  
**PAUL BATTISTA ZANABONI, MD, PHD** Associate Professor of Anesthesiology

## Department's Website

<http://www.anest.wustl.edu/>

## Department of Biochemistry and Molecular Biophysics

The department participates in Medical School teaching in the first year as well as offering a number of specialized courses in the major fields of biochemistry and biophysics. Students in the School of Medicine or those in the Graduate School of Arts and Sciences may enroll in these courses and pursue research work under the direction of members of the faculty. The interests of the faculty, listed below, cover many aspects of biochemistry and biophysics with special emphasis on structure/function relationships in proteins and nucleic acids, enzymology, metabolic regulation, molecular biology of gene expression and protein biosynthesis, signal transduction, and the dynamics of cytoskeletal structures.

## Courses

### ***First Year***

M15 502 MOLECULAR FOUNDATIONS OF MEDICINE  
Instructor: Linda J. Pike, Ph.D., 362-9502

This course is designed primarily for medical students and will cover fundamental aspects of biochemistry and cell biology. The course begins with a treatment of protein structure and the function of proteins in the cytoskeleton and cell motility. The principles of enzyme kinetics and regulation are then discussed and basic pathways for the synthesis and metabolism of carbohydrates and lipids are introduced. This leads into a discussion of membrane structure and the function cellular organelles in biological processes including energy production, protein degradation and protein trafficking. Non-medical students should register under L41 (Bio) 5319.

### ***Fourth Year***

## Electives

Descriptions of the elective courses are listed under the Division of Biology and Biomedical Sciences. In some instances, these courses are offered in alternate years. The faculty member in charge of the course should be contacted for specific times.

L41 (Bio) 5312 MACROMOLECULAR INTERACTIONS  
L41 (Bio) 5325 PROTEIN STRUCTURE AND FUNCTION  
L41 (Bio) 5384 ADVANCED CELL BIOLOGY/BIOCHEMISTRY OF MEMBRANES  
L41 (Bio) 5456 ADVANCED CRYSTALLOGRAPHY  
L41 (Bio) 5461 MOLECULAR RECOGNITION

L41 (Bio) 5464 COMPUTATIONAL BIOCHEMISTRY  
L41 (Bio) 548 NUCLEIC ACID AND PROTEIN BIOSYNTHESIS

*Note — The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences.*

## **Research**

### **(M15 900)**

#### **Cross-listed with L41 (Bio) 590**

Gary K. Ackers, Ph.D., 1st Floor South Building, 362-0260. Regulatory interactions in protein assemblies. Site-specific cooperativity mechanisms of human hemoglobin.

Nathan Baker, Ph.D., 113 Center for Computational Biology, 362-2040. Computational biology: multiscale modeling of biological process, biomolecular solvation, protein structure and dynamics.

Wayne M. Barnes, Ph.D., 3rd Floor North Building, 362-3351. Plant and DNA polymerase genetic engineering.

Peter M. J. Burgers, Ph.D., 1st Floor South Building, 362-3872. Molecular biology of yeast chromosomal DNA replication and DNA repair.

Peter T. Chivers, Ph.D., 1st Floor South Building, 362-1496. Mechanisms of metalloregulation. Protein structure/function relationships.

David P. Cistola, M.D., Ph.D., 2nd Floor North Building, 362-4382. Structural biology of lipid- and drug-binding proteins. NMR spectroscopy. Molecular recognition.

Enrico Di Cera, M.D., 2nd Floor McDonnell Science Building, 362-4185. Molecular recognition. Structure and function of serine proteases.

Elliot L. Elson, Ph.D., 2nd Floor McDonnell Science Building, 362-3346. Cellular mechanics and cytoskeletal structure and function.

William A. Frazier, Ph.D., 2nd Floor McDonnell Science Building, 362-3348. The role of the extracellular matrix protein thrombospondin in vascular biology.

Carl Frieden, Ph.D., 2nd Floor McDonnell Science Building, 362-3344. Protein folding. Role of chaperones: Protein-protein interactions. Relationship of enzyme structure to function.

Victor Guallar, Ph.D., 112 Center for Computational Biology, 362-8782. Quantum chemistry combined with protein structure to study biochemical systems. RNA-protein interaction. Hemoglobin. Drug covalent binding.

Kathleen Hall, Ph.D., 2nd Floor North Building, 362-4196. RNA structure/function. RNA:protein interactions. NMR spectroscopy.

Jo Holt, Ph.D., 1st Floor South Building, 362-4406. Allosteric control mechanisms in human hemoglobin: Kinetics and thermodynamic-linkage analysis, multi-angle light scattering.

Timothy M. Lohman, Ph.D., 2nd Floor North Building, 362-4393. Biophysical chemistry of proteins, nucleic acids and their mechanism of interaction. Mechanisms of DNA unwinding and translocation by helicases and SNB proteins.

John E. Majors, Ph.D., 1st Floor South Building, 362-1135. Control of eukaryotic gene expression.

Garland R. Marshall, Ph.D., 2nd Floor Old Shriners Building, 362-1567. Molecular recognition, computer-aided drug design, peptidomimetics, protein structure prediction, signal transduction-GPCRs.

F. Scott Mathews, Ph.D., 2nd Floor South Building, 362-1080. X-ray crystallographic studies of

proteins and enzymes.

Linda J. Pike, Ph.D., 2nd Floor Cancer Research Building, 362-9502. Phosphoinositides and the role of caveolae/DIGs in signal transduction.

Jay Ponder, Ph.D., 208 Center for Computational Biology, 362-4195. Computational modeling of protein structure and energetics. Protein engineering.

William R. Wikoff, Ph.D., 2nd Floor South Building, 362-0727. Virus structure, assembly, and maturation studied by x-ray crystallography and related biophysical techniques.

## Faculty

**GARY K ACKERS, PHD** Professor of Biochemistry and Molecular Biophysics

**USHA P ANDLEY, PHD** Assistant Professor of Biochemistry and Molecular Biophysics

**NATHAN A BAKER, PHD** Assistant Professor of Biochemistry and Molecular Biophysics

**JAMES GERALD BANN, PHD** Research Instructor in Biochemistry and Molecular Biophysics

**WAYNE MORRIS BARNES, PHD** Associate Professor of Biochemistry and Molecular Biophysics

**BARBARA I BROWN, PHD** Professor Emerita of Biological Chemistry

**DAVID HENRY BROWN, PHD** Professor Emeritus of Biological Chemistry

**PETER M BURGERS, PHD** Professor of Biochemistry and Molecular Biophysics

**OSCAR P. CHILSON, PHD** Associate Professor of Biochemistry and Molecular Biophysics

**PETER TRISTRAM CHIVERS, PHD** Assistant Professor of Biochemistry and Molecular Biophysics

**DAVID PAUL CISTOLA, MD, PHD** Associate Professor of Biochemistry and Molecular Biophysics

**ENRICO DI CERA, MD** Professor of Biochemistry and Molecular Biophysics

**GEORGE ROBERT DRYSDALE, PHD** Professor Emeritus of Biochemistry and Molecular Biophysics

**SARAH C.R. ELGIN, PHD** Professor of Biochemistry and Molecular Biophysics

**ELLIOT L ELSON, PHD** Alumni Endowed Professor of Biochemistry and Molecular Biophysics

**JUDY ANN FEE, PHD, BS** Research Instructor in Biochemistry and Molecular Biophysics

**WILLIAM A FRAZIER, III, PHD** Professor of Biochemistry and Molecular Biophysics

**DAVID H FREMONT, PHD** Associate Professor of Biochemistry and Molecular Biophysics

**CARL FRIEDEN, PHD** Raymond H Wittcoff Professor of Biochemistry and Molecular Biophysics, Head of The Department of Biochemistry and Molecular Biophysics

**GREGORY I GOLDBERG, PHD** Professor of Biochemistry and Molecular Biophysics

**DAVID I GOTTLIEB, PHD** Associate Professor of Biochemistry and Molecular Biophysics

**VICTOR GUALLAR, PHD** Assistant Professor of Biochemistry and Molecular Biophysics

**KATHLEEN HALL, PHD** Associate Professor of Biochemistry and Molecular Biophysics

**SYDNEY D HOELTZLI, PHD** Research Instructor in Biochemistry and Molecular Biophysics

**WILLIAM F HOLMES, PHD** Associate Professor Emeritus of Biological Chemistry

**JO MARIE HOLT, PHD** Research Assistant Professor of Biochemistry and Molecular Biophysics

**JOHN M JEAN, PHD** Research Assistant Professor of Biochemistry and Molecular Biophysics

**STUART A KORNFELD, MD** Professor of Biochemistry and Molecular Biophysics

**ALEXANDER KOZLOV, PHD** Research Instructor in Biochemistry and Molecular Biophysics.

**LINDA C KURZ, PHD** Research Associate Professor of Biochemistry and Molecular Biophysics

**ELLEN LI, MD, PHD** Associate Professor of Biochemistry and Molecular Biophysics

**TIMOTHY M LOHMAN, PHD** Marvin A Brennecke Professor of Biological Chemistry in Biochemistry and Molecular Biophysics

**PHILIP W MAJERUS, MD** Professor of Biochemistry and Molecular Biophysics

**JOHN E MAJORS, PHD** Associate Professor of Biochemistry and Molecular Biophysics

**GARLAND R MARSHALL, PHD** Professor of Biochemistry and Molecular Biophysics  
**F. SCOTT MATHEWS, PHD** Professor of Biochemistry and Molecular Biophysics  
**STEPHEN M MOERLEIN, PHD** Associate Professor of Biochemistry and Molecular Biophysics  
**GREGORY V NIKIFOROVICH, D SC, PHD** Research Professor of Biochemistry and Molecular Biophysics  
**ROHIT V. PAPPU, PHD** Assistant Professor of Biochemistry and Molecular Biophysics  
**LINDA J PIKE, PHD** Associate Professor of Biochemistry and Molecular Biophysics  
**JAY WILLIAM PONDER, PHD** Associate Professor of Biochemistry and Molecular Biophysics  
**KATHERINE P PONDER, MD** Assistant Professor of Biochemistry and Molecular Biophysics  
**JOSEPH L ROTI ROTI, PHD** Professor of Biochemistry and Molecular Biophysics  
**J. EVAN SADLER, MD, PHD** Professor of Biochemistry and Molecular Biophysics  
**SAVEEZ SAFFARIAN** Research Instructor in Biochemistry and Molecular Biophysics  
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**DOUGLAS M TOLLEFSEN, MD, PHD** Assistant Professor of Biochemistry and Molecular Biophysics  
**TETSURO WAKATSUKI, PHD** Research Instructor in Biochemistry and Molecular Biophysics  
**GABRIEL WAKSMAN, PHD** Adjunct Professor of Biochemistry and Molecular Biophysics  
**WILLIAM ROBERT WIKOFF, PHD** Assistant Professor of Biochemistry and Molecular Biophysics  
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## Department's Website

<http://www.biochem.wustl.edu/>

## Department of Cell Biology and Physiology

The department offers instruction to medical and graduate students. The Cell and Organ Systems course is designed to provide first-year medical students with a foundation for their further study of clinical and applied physiology. The Molecular Cell Biology course for first-year graduate students conveys an understanding of fundamental cell biology research strategies and principles. In addition, advanced courses open to medical and graduate students provide for more detailed study of specific areas of cell biology, physiology and cellular biophysics.

The research interests of our faculty, listed in more detail below, encompass a range of key fields within cell biology and physiology. Our research on the biology of cells focuses on apoptosis, cell cycle control, cytoskeleton, extracellular matrix, intracellular transport, ion channels, stem cell differentiation and yeast cell biology. Our physiology research emphasizes diabetes, epithelial transport, muscle contractile activation, peripheral circulation, prion disease biology, and cardiovascular, neuro-, renal, and respiration physiology.

## Courses

### *First Year*

#### M75 503 CELL AND ORGAN SYSTEMS BIOLOGY

Instructor: Robert S. Wilkinson, Ph.D., 362-2300

This course integrates and extends the basic principles of cell biology and physiology to the functions of the major organ systems of the body; i.e., muscle, cardiovascular, renal, respiratory, gastrointestinal and endocrine. Limited space is available for non-medical students with instructor's permission. This course is cross-listed in Department of Anatomy and Neurobiology.



## Selectives

### M04 519 CASE PROBLEMS IN BIOCHEMISTRY AND CELL BIOLOGY

Instructors: Thomas H. Steinberg, M.D., 362-9218; Samuel L. Stanley Jr., M.D., 362-1070; Ellen Li, M.D., Ph.D., 362-1072

In this elective, a problem-oriented approach will be used to explore the connections between basic science and clinical medicine. Each group of six to eight students will be confronted with clinical cases. Under the guidance of a faculty facilitator, the goal will be to understand the clinical aspects of the cases and to delve into the scientific issues that arise from them. No previous medical or surgical experience is required. This course is cross-listed in Department of Medicine.

### M04 534A PROGRESSION OF KIDNEY DISEASE

Instructor: Jeremiah J. Morrissey, Ph.D., 454-7464

Diabetes and hypertension are the leading initiating events that cause renal disease. Other immunologic and non-immunologic factors precipitate nephron loss. Once started, however, there is an inexorable deterioration of kidney function that culminates in renal replacement therapies. Dialysis and transplantation are expensive programs that also impact the quality of life of the patient. In this selective, we will compare and contrast molecular and cellular events in the progression of renal fibrosis due to epithelial/mesenchymal and endothelial/mesenchymal transdifferentiation. Newer treatments with growth factors show promise to blunt and possibly reverse fibrosis that is due to cell transdifferentiation, thus preserving or enhancing renal function. Histologic examination and molecular/cell biologic approaches will be highlighted. For those students interested, visits to a dialysis clinic with an attending physician may be arranged.

### M04 537 CARDIOVASCULAR CONTROL MECHANISMS

Instructors: Jeffrey M. Gidday, Ph.D., 286-2795;

Dana R. Abendschein, Ph.D., 362-8925

A hands-on demonstration of various aspects of cardiovascular physiology in an anesthetized pig. Topics covered will include differences between left and right ventricular pressures, arterial pulse wave velocity, respiratory heart rate reflex, carotid sinus reflex, effects of drugs such as nitrates and alpha- and beta-receptor agonists on the heart and circulation, effects of vagal stimulation on cardiopulmonary dynamics, and responses to myocardial ischemia and infarction.

### M04 561 BRAIN BLOOD VESSELS

Instructor: Thomas A. Woolsey, M.D., 362-3600

This course considers structure, development, flow regulation and disease of cerebral blood vessels. Four general themes are: 1) the architecture of cerebral vessels, 2) regulation of cerebral blood flow during neural activity, 3) the blood-brain barrier, and 4) brain blood vessel development. Students select topics and papers for presentation from a menu. For the final session, students study a clinical problem and present their analysis to the rest of the group.

### M04 5667 MICROCIRCULATION

Instructor: Jeffrey M. Gidday, Ph.D., 286-2795

The homeostatic functions of the microcirculation include the active regulation of metabolite exchange with parenchymal cells, immune surveillance, and a multifaceted response to injury and disease. This elective provides an overview of the normal and abnormal cell biology and physiology of the microcirculation.

Four sessions will be organized around conceptual presentations and laboratory demonstrations by the instructor, and two-part topic presentations by students following independent library research that focuses on basic physiology and clinically relevant pathophysiology. Basic physiology research topics might include: regulation of tissue blood flow and vascular tone, propagated vasodilation, hemodynamics and rheology of erythrocytes and leukocytes, cell biology of the endothelium, control of capillary permeability, and angiogenesis. Common disease entities involving microcirculatory dysfunction include: stroke and myocardial ischemia, diabetes, inflammation, tumor angiogenesis, retinopathy of prematurity, pulmonary edema, various autoimmune diseases, as well as the adaptive cardiovascular responses to exercise or high altitude. This selective is cross-listed in Department of Neurological Surgery.

### M04 596 ION CHANNELS AND DISEASE

Instructor: Colin G. Nichols, Ph.D., 362-6630

Ion channels are present in all cells and direct intracellular events by controlling the membrane electrical activity. Many widely used clinical drugs act by altering the behavior of ion channels, and it is now becoming clear that many diseases, including epilepsy, hyperinsulinism, certain cardiac arrhythmias and cystic fibrosis result directly from inherited ion channel mutations.

We will consider the basis of ion channel diseases and ion channel modulation therapies. Students will research a topic of choice in the library over two to three weeks and then present their findings to the whole class. After the initial course meeting, we will not meet formally for three weeks, and will then meet once per week for presentations.

## ***Fourth Year***

### **Electives**

Descriptions of the following courses may be found under Division of Biology and Biomedical Sciences.

L41 (Bio) 5062 CENTRAL QUESTIONS IN CELL BIOLOGY

L41 (Bio) 5068 FUNDAMENTALS OF MOLECULAR CELL BIOLOGY

L41 (Bio) 5122 CELL-MATRIX INTERACTIONS

L41 (Bio) 5132 CELL MOTILITY AND CYTOSKELETON JOURNAL CLUB

Note — The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences. See course descriptions in the Graduate Programs section of this catalog.

### **Research**

#### ***(M75 900)***

#### **Cross-listed with L41(Bio)590**

Dana Abendschein, Ph.D., 9924 Clinical Sciences Research Building, 362-8925. Responses of arteries to acute injury and coagulation mediators of arterial remodeling after injury.

Kendall Blumer, Ph.D., 413 McDonnell Science Building, 362-1668. Hormone and neurotransmitter signaling by G proteins.

John Cooper, M.D., Ph.D., 416 McDonnell Science Building, 362-3964. The roles of actin and microtubules in cell motility and the cell cycle.

Phyllis I. Hanson, M.D., Ph.D., 4625 Cancer Research Building, 747-4233. Study of protein-protein and protein-membrane interactions involved in neuronal and synaptic membrane trafficking using biochemical, biophysical, and cell biological techniques.

David A. Harris, M.D., Ph.D., 5508 Cancer Research Building, 362-4690. Molecular and cellular biology of prion diseases.

John Heuser, M.D., 4900 South Building, 362-6948. Development of new methods for visualizing cells and molecules in three dimensions by means of electron microscopy, and for capturing macromolecular mechanisms through rapid freezing techniques.

Keith A. Hruska, M.D., 5th Floor McDonnell Pediatric Research Building, 286-2772. The research in the laboratory focuses on new therapies for chronic kidney disease, osteoarthritis and their complications. The mechanisms of action of these therapies for nephropathy, vascular calcification and renal bone disease are being analyzed, as are mechanisms enabling cartilage transplantation.

James Huettner, Ph.D., 6600 Cancer Research Building, 362-6628. Excitatory amino acid receptors and synaptic transmission in the central nervous system; neural differentiation of embryonic stem cells.

Maurine Linder, Ph.D., 5513 Cancer Research Building, 362-6040. G-protein mediated signal transduction; protein palmitoylation in signal transduction and protein trafficking.

Robert Mecham, Ph.D., 4606 Cancer Research Building, 362-2254. Understanding the complex process of extracellular matrix assembly and organization, including studying the intracellular pathways used to transport matrix components to the cell surface and identifying helper or accessory proteins that facilitate trafficking and matrix assembly. Cell-matrix interactions in development and cellular mechanisms associated with connective tissue remodeling in vascular disease and heritable diseases of connective tissues.

Robert Mercer, Ph.D., 5518 Cancer Research Building, 362-6924. Structure and function of cation transport proteins. Molecular biology of the Na, K-ATPase. Polarized sorting of membrane proteins in cultured epithelial cells.

Mike Mueckler, Ph.D., 6606 Cancer Research Building, 362-4160. Molecular biology of mammalian glucose transporters. Regulation of glucose transport by insulin and the mechanism of insulin signaling. Subcellular trafficking of the insulin-regulated glucose transporter. Structure and function relationships of glucose transporters. Mechanism of insertion of complex polytopic proteins into the rough endoplasmic reticulum membrane.

Colin Nichols, Ph.D., 4624 Cancer Research Building, 362-6630. The molecular mechanisms of potassium channel regulation and how potassium channels link metabolism to excitability in different physiological and disease states.

Helen Piwnicka-Worms, Ph.D., 425 McDonnell Science Building, 362-6812. Cell cycle- and checkpoint-control in normal and cancer cells.

Paul Schlesinger, M.D., 406 McDonnell Science Building, 362-2223. Molecular mechanisms and regulation of intracellular channels for acidification of intracellular vesicles and the molecular pores formed in apoptosis.

Philip Stahl, Ph.D., 4912 South Building, 362-6950. Signal transduction, membrane trafficking events and the mechanism of endocytosis and phagocytosis including the role of low molecular weight GTPases Ras and Rab. Molecular cell biology of the mannose receptor family of endocytic/phagocytic and signal transducing receptors— structure, function and role of innate immunity.

Sheila A. Stewart, Ph.D., 514 McDonnell Science Building, 362-3934. Molecular mechanisms by which telomerase controls cellular mortality and immortality.

Heather L. True-Krob, Ph.D., 514 McDonnell Science Building, 362-3934. Biological consequences of yeast prions<sup>3/4</sup>in both their capacity to function as a novel epigenetic elements, and in their utility to serve as a tractable model for the analysis of protein misfolding and aggregation that occurs in several neurodegenerative disorders.

Robert S. Wilkinson, Ph.D., 6615 Cancer Research Building, 362-2300. Cellular physiology of nerve-muscle synapses, especially the regulation of synaptic strength and the role of vesicle processing in determining synaptic properties.

## Faculty

**PHILIP DAMIEN STAHL, PHD** Edward Mallinckrodt Jr Professor of Cell Biology and Physiology, Head of Department of Cell Biology and Physiology

**DANA RAY ABENDSCHEIN, PHD** Associate Professor of Cell Biology and Physiology

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**RICHARD HEILCHAPDELAINE, PHD** Research Assistant Professor of Cell Biology and Physiology  
**JOHN E HEUSER, MD** Professor of Cell Biology and Physiology  
**MICHAEL J HOLTZMAN, MD** Professor of Cell Biology and Physiology  
**RICHARD C HRESKO, PHD** Research Assistant Professor of Cell Biology and Physiology  
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**PAUL W. HRUZ, MD, PHD** Assistant Professor of Cell Biology and Physiology  
**JAMES E HUETTNER, PHD** Associate Professor of Cell Biology and Physiology  
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**SAMUEL KLEIN, MD** Professor of Cell Biology and Physiology  
**JOSEPH C KOSTER, PHD** Research Assistant Professor of Cell Biology and Physiology  
**SANDOR J KOVACS, MD, PHD** Associate Professor of Cell Biology and Physiology  
**HYUNJUNG JADE LIM, PHD** Assistant Professor of Cell Biology and Physiology  
**MAURINE E LINDER, PHD** Associate Professor of Cell Biology and Physiology  
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**MITSUYOSHI SAITO, DDENT, PHD** Instructor in Cell Biology and Physiology

**LINDA J SANDELL, PHD** Professor of Cell Biology and Physiology

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**THOMAS A WOOLSEY, MD** Professor of Physiology

**KEVIN E YARASHESKI, PHD** Associate Professor of Cell Biology and Physiology

## Department's Website

<http://www.cellbio.wustl.edu/>

## James S. McDonnell Department of Genetics

The Department of Genetics is at the forefront in developing new methods for physical and genetic mapping of the human genome and for identifying and isolating genes that cause inherited disease or susceptibility to disease. The department supports a broad program of preclinical and graduate instruction in genetics, with research opportunities ranging from established experimental organisms to humans, and from molecular genetics to population genetics.

A significant portion of the first-year course in basic medical sciences is devoted to human and clinical genetics, and particularly to the impact of new genetic technologies on the practice of medicine. Advanced training in clinical genetics and in genetic research is available from the faculty in the Department of Genetics and from geneticists with principal appointments in many other departments within the School of Medicine.

The Department of Genetics offers a broad range of training in virtually all major areas of modern genetics. Numbered among the faculty are world leaders in genetic mapping, new methods of DNA manipulation and cloning, computational biology, developmental genetics, neurogenetics, immuno-genetics, human genetics, and population and evolutionary genetics. In addition to human

genetics, research opportunities with experimental organisms include genetic studies with the mouse, fruit flies, nematodes, yeast, bacteria, chlamydomonas and zebrafish.

Advanced courses and seminars are offered that focus on such subjects as the genetics of inherited disease, gene expression, genetic mapping, molecular genetics, developmental genetics, microbial genetics, immunogenetics, and population and evolutionary genetics. Extraordinary opportunities for research training and experience are available in all of these areas and at all levels. The programs are tailored to meet the needs of medical students, graduate students, and both M.D. and Ph.D. postdoctoral students pursuing advanced training in biomedical research.

## **Courses**

### ***First Year***

#### **M30 511 MEDICAL GENETICS**

For full description, see Department of Pediatrics.

### ***Fourth Year***

#### **Electives**

For complete descriptions, see Division of Biology and Biomedical Sciences.

L41 (Bio) 5235 GENETICS JOURNAL CLUB

L41 (Bio) 5488 GENOMICS

L41 (Bio) 5491 ADVANCED GENETICS

L41 (Bio) 5495 COMPUTATIONAL MOLECULAR BIOLOGY

L41 (Bio) 5911 CLASSICAL EXPERIMENTS IN MOLECULAR GENETICS

*Note — The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences.*

## **Research**

### ***(M20 900)***

#### **Cross-listed with L41 (Bio 590)**

Anne Bowcock, Ph.D., 331 Biotechnology Building, 747-3261. Molecular genetics of human disease.

Barak Cohen, Ph.D., 864B McDonnell Science Building, 362-3674. Functional Genomics in Yeast. Gene regulatory networks and the genetic basis of variation in cell cycle regulation.

Janet M. Connolly, Ph.D., 719 McDonnell Science Building, 362-3958. Research in immunology. Thymic development and antigen specificity of T lymphocytes using transgenic mouse model systems.

Susan K. Dutcher, Ph.D., 704 McDonnell Science Building, 362-2765. Studies on the role of centrioles and basal bodies in the assembly of cilia and cleavage furrows using molecular genetics and biochemical approaches.

Sean Eddy, Ph.D., 822 McDonnell Science Building, 362-7666. Computational biology: RNA and protein structure prediction; genome analysis.

Justin Fay, Ph.D., 868 McDonnell Science Building, 747-1808. Population and evolutionary genetics, evolution and genetic basis of gene expression in yeast, human DNA sequence variation and evolution.

Warren Gish, Ph.D., 4444 Forest Park Building, Room 4186A, 286-1826. Research and development of automated systems for gene prediction, identification and annotation. Emphasis is on combining

biological knowledge with the use of rapid search methods and information theory.

Ted Hansen, Ph.D., 727 McDonnell Science Building, 362-2716. Molecular immunology of antigen presentation. Intracellular antigen processing, peptide binding to MHC molecules and presentation to immune T cells.

Stephen L. Johnson, Ph.D., 711 McDonnell Science Building, 362-0362. Growth control and morphogenesis in vertebrate development. Focus on genes and mechanisms affecting proportionate fin growth, fin regeneration and pigment stripe patterning in zebrafish.

Mark Johnston, Ph.D., 858 McDonnell Science Building, 362-2735. Transcriptional control mechanisms in eukaryotic cells, diabetes in yeast and mechanisms of signal transduction.

Michael Lovett, Ph.D., 331 Biotechnology Building, 747-3261. The molecular basis of human genetic diseases, cDNA and expression profiling technologies. Craniofacial abnormalities and deafness.

Elaine Mardis, Ph.D., 4444 Forest Park Building, Room 4122, 286-1805. Technology development for high-throughput genome sequencing with an emphasis on methods development and the implementation of robotics. Microarray-based studies of gene expression levels in organisms including *C. elegans* and human.

Tim Schedl, Ph.D., 870 McDonnell Science Building, 362-6162. Germ cell development in the model organism *Caenorhabditis elegans*. The major focuses are: control of the decision to proliferate or enter the meiotic pathway, control and coordination of meiotic prophase progression and gametogenesis, and control of meiotic maturation and ovulation.

James Skeath, Ph.D., 812A McDonnell Science Building, 362-0535. Identification of the genes and the elucidation of the molecular mechanisms that regulate the early events of *Drosophila* central neurogenesis; illumination of the mechanisms that form, pattern and specify the individual identities of the progenitor cells of the *Drosophila* embryonic CNS.

Gary D. Stormo, Ph.D., 853 McDonnell Science Building, 747-5534. Computational biology of protein-DNA interactions, RNA folding, gene and promoter finding. Biochemical analysis of DNA-protein interactions and gene regulation.

Richard K. Wilson, Ph.D., 4444 Forest Park Building, Room 4122, 286-1804. Genome research. Large-scale DNA sequence analysis of genomes and expressed genes (cDNAs) from *H. sapiens*, mouse, *C. elegans*, *C. briggsae*, *A. thaliana* and *S. cerevisiae*. Development of novel technology for large-scale DNA sequence analysis and genetic analysis.

Tanya Wolff, Ph.D., 829 McDonnell Science Building, 362-1509. Epithelial polarity and cell movement in the *Drosophila* eye. Major emphasis is placed on studying the genes and pathways required for the establishment, interpretation and transduction of the polarity signal.

## Faculty

**DOUGLAS E BERG, PHD** Professor of Genetics

**INGRID B BORECKI, PHD** Research Associate Professor of Genetics

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**MICHAEL A PROVINCE, PHD** Professor of Genetics

**JANET SUE RADER, MD** Professor of Genetics

**DABEERU C RAO, PHD** Professor of Biostatistics in Genetics

**JOHN P RICE, PHD** Professor of Genetics

**ELENA RIVAS, PHD** Research Assistant Professor of Genetics

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**GARY D STORMO, PHD** Professor of Genetics



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**ALAN ROBERT TEMPLETON, PHD** Professor of Genetics  
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**MICHAEL PETER WHYTE, MD** Professor of Genetics  
**RICHARD K WILSON, PHD** Professor of Genetics  
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## Department's Website

<http://www.genetics.wustl.edu/>

## John Milliken Department of Medicine

The Department of Medicine's general medicine teaching services at Barnes-Jewish Hospital and the Veterans Administration Medical Center (St. Louis) are under the following directors:

Barnes-Jewish Hospital, Kenneth S. Polonsky, M.D.  
(Chairman, Department of Medicine)

Veterans Administration Medical Center, Lewis R. Chase, M.D.

In addition, for the purposes of both teaching and research, the Department of Medicine is divided into specialty divisions and sections at Barnes-Jewish Hospital under the following chiefs:

Allergy and Clinical Immunology Diseases  
H. James Wedner, M.D., Acting Chief

Bioorganic Chemistry and Molecular Pharmacology  
Richard W. Gross, M.D., Ph.D., Chief

Bone and Mineral Diseases  
Dwight A. Towler, M.D., Ph.D., Chief

Cardiology/Cardiovascular Diseases  
Michael E. Cain, M.D., Chief

Center for Health Behavior Research  
Edwin B. Fisher, Ph.D., Chief

Dermatology  
Lynn A. Cornelius, M.D., Chief

Endocrinology/Metabolism/Lipid Research  
Clay F. Semenkovich, M.D., Chief

Gastroenterology  
Nicholas O. Davidson, M.B.B.S., Chief

General Medical Sciences  
Bradley A. Evanoff, M.D., M.P.H.

Geriatrics and Nutritional Science

Samuel Klein, M.D., Chief

Hematology

Stuart A. Kornfeld, M.D.; Philip W. Majerus, M.D., Co-Chiefs

Infectious Diseases (Clinical)

Gerald Medoff, M.D., Acting Co-Chief

Infectious Diseases (Basic Science)

Daniel E. Goldberg, M.D., Ph.D., Co-Chief

Medical Education

Daniel M. Goodenberger, M.D., Chief

Oncology

John F. DiPersio, M.D., Ph.D., Chief

Pulmonary and Critical Care Medicine

Michael J. Holtzman, M.D., Chief

Renal Diseases

Marc R. Hammerman, M.D., Chief

Rheumatology

Wayne M. Yokoyama, M.D., Chief

Instruction in Medicine is provided during all four years of the medical curriculum, beginning with The Practice of Medicine I in the first year. Teaching in the second year has two main objectives: the correlation of the basic sciences with clinical aspects of disease and training in the technical methods of physical examination and laboratory diagnosis. By the beginning of the third year, the student is ready for supervised clinical study of individual patients.

A clinical clerkship of 12 weeks, divided into three four-week periods, is served by third-year students on the medical services of the department. In the final year, students may elect a subinternship in general medicine and a series of elective courses in the medical specialties.

## **Courses**

### ***First Year***

#### **M25 507 THE PRACTICE OF MEDICINE I**

Instructor: Robert J. Rothbaum, M.D., 454-2134

The Practice of Medicine is a wide-ranging course. TPM I is the first part of a three-year continuum that introduces the varied interpersonal and professional skills required of the practicing physician. The course is organized into six content areas.

Several lectures and small group meetings within TPM I work to employ and unify the concepts covered in concomitant basic science courses and the six content areas. These activities include:

1. Students attend multiple visits to the offices of primary care physicians to observe ongoing medical evaluations and care.
2. Integrative cases consist of presentation of a particular patient disorder, interview of the patient and family, and in-depth analysis of the basic science, clinical and humanistic aspects of the illness.
3. Additional lectures review the history of medicine and complex social and psychological issues.

Content Areas:

#### **INTERPRETING ILLNESS**

Content Area Leader: Stephen S. Lefrak, M.D., 454-7116

Each patient presents with a particular set of symptoms and signs. The clinical manifestations of illness represent, however, only a limited portion of the patient's life story and experience. This content area focuses on development of an appreciation of how illness affects daily life, interpersonal relationships and future plans. Illness is analyzed from a variety of perspectives, including the patient's recounting of their medical history, descriptions of illness and its effects in literature resources, and the experience of a home visit with a family. In addition, the experience of illness in

different cultural and ethnic groups is investigated.

#### HEALTH PROMOTION/DISEASE PREVENTION

Content Area Leader: Bradley A. Evanoff, M.D., M.P.H., 454-8638

This overview of public health and preventative medicine combines theory and application so that students can interpret the scientific literature and develop an understanding of the social, political, and economic factors that might affect individual health status. The promise and difficulties of health promotion and preventative medicine are emphasized. Student presentations at a health symposium conclude the course.

#### SCIENTIFIC METHOD OF CLINICAL MEDICINE AND RESEARCH

Content Area Leader: Jay F. Piccirillo, M.D., 362-7394

The current emphasis on evidence-based medicine requires an ability to analyze and interpret the medical literature. This content area focuses on developing expertise in medical statistics and clinical epidemiology. This ability is essential for the future analysis of clinical studies and evaluation of potential patient evaluation and therapies. Lectures and small group session delineate and explain statistical terminology and techniques. This knowledge is then applied to analysis of actual clinical studies.

#### CLINICAL SKILLS

Content Area Leader: Katherine Henderson, M.D., 747-2729

This content area provides an introduction to history taking and physical examination. Students will learn to obtain a complete medical history and perform a thorough physical examination. Students will practice detailing these finding in written form.

#### PATIENT-PHYSICIAN COMMUNICATION

Content Area Leader: Kellie L. Flood, M.D., 286-2700

Clear communication between patient and physician forms the foundation of a therapeutic partnership. First this content area focuses on obtaining information from the patient. The medical history contains information essential for formulating an accurate diagnosis. Thus, development of history-taking skills is a cornerstone of clinical medicine. Secondly, this content area develops skills for the physician to communicate information to the patient in a concise and clear manner. Effective communication is the basis for successful therapy. Students observe and perform patient interviews, work with standardized patients, and evaluate videotape examples during small group sessions.

#### ETHICS AND HEALTH POLICY

Content Area Leader: Rebecca S. Dresser, J.D., 454-7116

This content area provides an introduction to ethical, social, and legal dilemmas that face physicians. Covered topics include the ethical responsibilities of medical students, the difficulties of facing errors, the challenges of working with supervising physicians and the responsibilities of power. Issues in clinical research and resource allocation are also reviewed.

### Selectives

#### M04 514 CARDIOVASCULAR BIOPHYSICS

Instructor: Sándor J. Kovács, Ph.D., M.D., 454-8146

This elective is intended for students with a background in the physical sciences: physics, mathematics, engineering, computer sciences and comparable fields. Topics covered vary according to the interest of the staff and the clinical spectrum encountered during the course of the elective. Included are quantitative cardiovascular physiology and pathophysiology, nonlinear dynamics and its application to physiology, biophysics, ultrasonics, biomechanics and biomedical engineering. The focus of the elective is the application of quantitative mathematical and engineering principles to solve real problems encountered in clinical practice. Participation in weekly seminars and familiarity with selected topics of current research are included. This course is offered in alternate years (2003-2004).

#### M04 519 CASE PROBLEMS IN BIOCHEMISTRY AND CELL BIOLOGY

Instructors: Thomas H. Steinberg, M.D., 362-9218; Samuel L. Stanley Jr., M.D., 362-1070; Ellen Li, M.D., Ph.D., 362-1072

In this elective, the "problem-oriented" approach will be used to explore the connections between basic science and clinical medicine. Each group of six to eight students will be confronted with clinical cases. Under the guidance of a faculty "facilitator," the goal will be to understand the clinical aspects of the cases and to delve into the scientific issues that arise from them. No previous medical or surgical experience is required. This selective is cross-listed in Department of Cell Biology and

Physiology.

#### M04 533 TROPICAL MEDICINE

Instructor: Daniel E. Goldberg, M.D., 362-1514

Washington University School of Medicine has several faculty members who are actively researching diseases specific to developing countries. This elective is designed to bring these individuals together, in an informal discussion forum with students, to highlight the problems particular to geographical medicine. The elective will cover issues including eradication, prevention and treatment, immunology and vaccine development, as well as descriptions of the different disease syndromes. This selective is cross-listed in Department of Molecular Microbiology.

### ***Second Year***

Teaching by the Department of Medicine is designed to: 1) prepare students for the transition from the preclinical sciences to the study of the sick patient at the bedside, 2) help them analyze the clinical manifestations of disease in terms of the responsible mechanisms, and 3) introduce them to the techniques of examination that are used regularly on all clinical services. This instruction is undertaken jointly with members of other clinical departments and is coordinated with subject matter presented by the Department of Pathology.

The major areas of clinical medicine are presented in detail to illustrate the application of biochemical, physiological and anatomical information to the understanding of pathological states. Cardiovascular, renal, neurological, gastrointestinal, pulmonary, hematological, metabolic, nutritional and developmental diseases are discussed. Emphasis is placed on the use of fundamental information in approaching clinical problems as a way of thinking that prepares the student for a lifetime of medicine, during which new information will constantly be acquired.

#### M25 607 THE PRACTICE OF MEDICINE II

Instructor: Megan Wren, M.D., 362-8050

Content Area Leaders: Stephen S. Lefrak, M.D.; Bradley A. Evanoff, M.D., M.P.H.; Jay F. Piccirillo, M.D.; Katherine Henderson, M.D.; Kellie L. Flood, M.D.; Rebecca S. Dresser, J.D.

The goal of The Practice of Medicine (TPM) is to provide students with a set of knowledge, skills and attitudes essential to patient care regardless of specialty. TPM II is a continuation of TPM I and will build on concepts introduced during TPM I. TPM II will continue to address various interfaces between patients, physicians and society and will also introduce approaches to clinical thinking and decision-making in the context of today's socio-economic and cultural environment. The sections of TPM II include Advanced Physical Examination, Case Development, Communication, Ethics and Health Policy, Health Promotion/Disease Prevention, Interpreting Illness, Ophthalmology, Patient Sessions, Radiology and Scientific Methods. The learning objectives for each section of TPM II emphasize topics and skills utilized in all fields of medicine, and the majority of the coursework for TPM II will be taught in small groups or through clinical experiences. 77.5 clock hours.

#### M25 605A INFECTIOUS DISEASES AND MEDICAL MICROBIOLOGY

Instructor: Nigar Kirmani, M.D., 454-8217

The infectious disease pathophysiology course emphasizes both organism-specific and organ-specific approaches to diseases caused by microbes. The course expands on material presented briefly in the first year concerning bacteria, viruses, fungi and parasites, and their involvement in human disease. Mechanisms of disease production, clinical manifestations and therapy are discussed, along with public health implications. In addition to lectures, small group case discussions enable students to apply the information they learn to clinical situations.

#### M25 606A RHEUMATOLOGY

Instructor: Leslie E. Kahl, M.D., 454-7279

The rheumatology pathophysiology course begins with an overview of the structure, function and physiology of the normal joint. The pathophysiology of both localized joint disorders such as osteoarthritis and infectious arthritis are presented, along with systemic inflammatory disorders including rheumatoid arthritis, lupus and vasculitis. Diagnosis, pharmacologic management and rehabilitation of these conditions are included. In small group sessions, students interview patients and observe the characteristic physical findings of these disorders.

#### M25 611B CARDIOVASCULAR DISEASE

Instructor: Dana R. Abendschein, Ph.D., 362-8909

The purpose of this course is to consider the mechanisms and manifestations of acquired and congenital cardiovascular disorders as well as their pharmacologic treatment. Lectures and group discussions that emphasize the major areas of cardiac pathophysiology and pharmacology are provided.

#### M25 612B PULMONARY DISEASE

Instructor: Michael B. Lippmann, M.D., 289-6306

The objectives of the pulmonary pathophysiology course include review of normal pulmonary physiology as related to specific pulmonary disease states. The focus of the course will largely be upon presentations in lectures concerning pathophysiologic principles of abnormal lung structure and function. In addition, case study problems will be discussed.

#### M25 613B RENAL AND GENITOURINARY DISEASES

Instructor: Stanley Misler, Ph.D., M.D., 454-7719; David Windus, M.D., 362-7261

This course uses basic principles of renal physiology and ion homeostasis to understand commonly encountered fluid and electrolyte disorders (especially hyper/hypo-natremias, acidoses/alkaloses) and the action of diuretic drugs. It also applies basic principles of urinary system anatomy and physiology to the understanding of diseases affecting glomerular and/or tubular function, and micturition. Lectures and problem sessions focus special attention on:

1) how a working knowledge of fundamentals, a few simple diagnostic tests and a little arithmetic manipulation can have important predictive value; and 2) how the courses of acute and chronic renal failure are both adaptive and maladaptive for the organism. The course also introduces basic principles of dialysis and transplant through on-site visits to treatment centers.

#### M25 614 DERMATOLOGY

Instructor: Jeffrey Petersen, M.D., 996-8810

The Dermatology second-year course is designed to teach medical students how to describe skin lesions and the pathophysiological basis and clinical characteristics of major dermatologic diseases. Major categories of clinical skin diseases and their most prominent constituents will be discussed, including papulosquamous diseases, blistering diseases, infectious diseases, and benign and malignant neoplasms.

#### M25 615A ENDOCRINOLOGY AND METABOLISM

Instructor: William E. Clutter, M.D., 362-8067

This course aims to develop understanding of the pathophysiology, clinical manifestations and diagnosis of common endocrine disorders. History, physical examination and interpretation of diagnostic laboratory tests are emphasized. Principles of treatment of endocrine disorders and pharmacology of relevant drugs also are discussed. Students are expected to apply their knowledge in clinical case discussions.

#### M25 620A GASTROINTESTINAL AND LIVER DISEASES/NUTRITION

Instructor: Deborah C. Rubin, M.D., 362-8935

This course discusses the pathophysiologic mechanisms related to the diseases of the gastrointestinal tract including esophagus, stomach, small and large intestines, liver, gallbladder and pancreas. The emphasis is on changes that occur in normal physiology, biochemistry, anatomy, immunology and cell biology that result in human gastroenterologic diseases. Included also are lectures on the pharmacology of gastrointestinal drugs and basics of human nutrition in clinical practice. Lectures are supplemented by group seminars that focus on clinical case presentations.

#### M25 625A HEMATOLOGY AND ONCOLOGY

Instructor: Scot G. Hickman, M.D., 289-6308

The hematology and oncology pathophysiology course exposes students to common hematologic disorders and hematologic malignancies. The course utilizes lectures, clinical case discussions and practical sessions involving microscopy.

### ***Third Year***

#### M25 710 MEDICINE CLERKSHIP

Instructor: Thomas M. De Fer, M.D., 362-8050

The medicine clerkship provides supervised study of patients in both inpatient and ambulatory settings. For the inpatient rotations, students are assigned as clinical clerks to patients admitted to the cardiology and general medical teaching services of Barnes-Jewish Hospital and Veterans Administration Medical Center. For the outpatient rotations, students rotate through the ambulatory general medicine clinics at Barnes-Jewish Hospital and a community-based internal medicine practice. Teaching is provided by the chief of service, attending physicians, house staff, consultants, chief residents and regularly scheduled conferences. Formal instruction is given regarding core internal medicine topics during the clerkship.

#### M25 714 AMBULATORY: EMERGENCY MEDICINE

Instructors: Mark Levine, M.D., 362-6743; Sandy Sineff, M.D., 362-7959

The WUMS III Ambulatory Care Rotation takes place in the main emergency department of Barnes-Jewish Hospital. Three to five students at a time are assigned to this four-week rotation. Students will spend their first day in an orientation session that will include a brief survival in the ED introduction, a suture lab, and an educational video on domestic violence. A course "text" will be provided for the students on orientation day and is theirs to keep. On day two, students will begin primarily evaluating non-emergent patients in the emergency department (EM 2) and report directly to an attending or senior resident. There are four hours of mandatory conferences per week: 8-10 a.m. on Tuesdays and 8-10 a.m. on Wednesdays. There will be an opportunity to participate in helicopter ride-alongs with ARCH Airmedical Services and EMS. Students can expect to gain a wide range of skills in evaluating a variety of complicated and non-complicated patients. At the end of their rotation, students should be familiar with the approach to complex medical conditions like heart attacks, undifferentiated abdominal pain, and complications of pregnancy as well as the "bread and butter" of complaints of ambulatory medicine such as lacerations, simple respiratory tract infections and minor trauma.

WUMS III will be graded on their ability to make a formal patient presentation during a shift, their clinical skills, and their conference attendance. There will be a written test on the last Friday of the rotation based entirely on the material provided to the students at the start of the rotation.

#### M26 713 AMBULATORY: FAMILY MEDICINE

Instructor: Walton Sumner II, M.D., 454-8164

The family practice clerkship offered to third-year medical students is a preceptorship in which students work one-on-one with board-certified family physicians in St. Louis or outlying areas of Missouri and Illinois. Students may review preceptor profiles and comments that previous students made about preceptors. The clerkship makes every effort to accommodate student preferences for working with specific preceptors. Most students will work with a single preceptor for the duration of the four-week rotation. Some students will work with small groups, sometimes including family practice residents. The student will work closely with preceptors on a daily basis in the family physician's office. Students often accompany their preceptor on nursing home visits, hospital rounds, medical conferences and other educational activities at the discretion of the preceptor. Housing will be provided to students assigned to locations outside the immediate St. Louis vicinity. Weekend call schedules are arranged with the family practice preceptor: students assigned to out-of-town locations for this clerkship usually return to St. Louis on the weekends. Each student will receive a description of the goals and objectives for the four-week rotation, physical copies of Clinical Evidence and the Manual of Family Practice textbooks, and handheld computers with additional commercial clinical reference materials to use during the rotation. Students maintain patient encounter logs on handheld computers, and receive two short e-mail assignments during this rotation. Grades are calculated from preceptors' subjective evaluations (normalized for the preceptor), essay responses, and an evaluation of students' attention to primary care issues, as evidenced by encounter logs.

#### M25 740 DERMATOLOGY CLERKSHIP

Instructor: Lynn Cornelius, M.D., 454-8622

The goal of the dermatology clerkship is to provide a guide for the student to appreciate dermatology within the broader perspectives of medicine and biology. The student will develop familiarity with dermatologic vocabulary, learn to recognize and initiate therapy of common dermatologic disorders and become cognizant of uncommon or complicated dermatologic problems that require specialty care. Emphasis will be placed on careful history taking and physical

examination. Students will always work under the direction of the resident physician and the attending physicians in the clinic setting.

The student will participate in outpatient care at the following hospitals and affiliated clinics: Barnes-Jewish Hospital, Children's Hospital, Barnes-Jewish West County Hospital, the Veterans Administration Medical Center and Homer G. Phillips Hospital. These hospital settings will provide the student with ample exposure to a diverse patient population. Students will attend all clinical teaching rounds and conferences in addition to the basic science and cutaneous histopathology conferences. Normal workday hours are 8 a.m. to 5 p.m. with no night or weekend on-call responsibilities. Each student is provided with copies of the two recommended textbooks, Principles of Dermatology by B. Looking and The Color Atlas and Synopsis of Clinical Dermatology by T. B. Fitzpatrick for use during the clerkship; the textbooks are returned to the clerkship coordinator at the end of the clerkship for use by other students rotating in the dermatology division. The rotation attending physician and the resident physician will submit an evaluation based on the student's clinical skills, presentation, attitudes, overall performance and the end-of-rotation written exam score.

#### M25 750 GERIATRIC CLERKSHIP

Instructor: David B. Carr, M.D., 286-2706

The primary goal of the four-week clerkship in Geriatrics is to provide an opportunity for students to gain proficiency in the principles of geriatric evaluation, including the medical, psychological, social and functional assessments of older adults. Direct, hands-on experience with patients is a major feature of the clerkship. Students are expected to participate in the evaluation of three to five patients per week, in a variety of settings including the hospital Acute Care for the Elderly (ACE) unit on 3200 North Campus, the Older Adult Outpatient Assessment Program (Storz Building) and the Long Term Care Setting (Barnes Extended Care in Clayton). Students attend hospice, geropsychiatry rounds, and the geriatric conferences while on the rotation.

Students are assigned to a variety of attendings to enhance the experience. There is no night call or call on weekends. Participation on the hospital consult service will occur depending on volume. The day normally begins at 8 a.m. and is usually finished by 5 p.m. There will be time to read the detailed syllabus/bibliography. Students will be asked to present a brief topic of their choice at the end of the rotation and demonstrate knowledge of the geriatric screens and assessments.

#### M25 730 PHYSICAL MEDICINE AND REHABILITATION

Coursemaster: Oksana Volshteyn, M.D., 454-7757

Clerkship in PM&R for third-year medical students provides an opportunity to gain basic knowledge and clinical skills in evaluation and management of a wide range of neurological and musculoskeletal diseases and conditions that require specialized rehabilitative medical and therapeutic care. Students spend two weeks on the Spinal Cord Injury Unit (SCI) and two weeks on the Brain Injury (BI) and Stroke Unit at The Rehabilitation Institute of St. Louis. Students are expected to be a part of the rehabilitation team, follow two to three patients, participate in daily morning rounds, participate in performing consults, and attend team meetings and family conferences.

Students are required to attend several outpatient clinics such as SCI, BI, Amputee and Stroke. During the entire rotation, students work with PM&R residents and fellows, and under direct guidance of the NeuroRehabilitation faculty. The usual duty hours are 7-7:30 a.m. to 5 p.m. weekdays, and 8 a.m. to noon on Saturdays. There is no night call.

Students are required to attend all PM&R curriculum lectures and conferences. On the first day of rotation, students meet with the PM&R program director to go over goals, objectives and schedules. Upon completion of the rotation, students are required to fill out the evaluation form to provide feedback regarding rotation experience.

#### Clinical Pathological Conference

The clinical course, laboratory and radiologic studies, and pathological findings of a patient are discussed using a problem-solving format at a weekly conference by members of the Departments of Medicine, Pathology and Radiology.

Daniel M. Goodenberger, M.D., chief residents and medical staff; Louis P. Dehner, M.D., and pathology staff

## **Fourth Year**

### **Electives**

#### **M25 801 HONORS MEDICINE - GENERAL MEDICINE**

Instructor(s): Thomas De Fer, M.D., 362-8050

Location: Barnes-Jewish Hospital

Elective Contact: Yvonne McLaughlin, 362-8050

Other Information: Students will receive e-mail communication regarding where to report on the first day prior to the beginning of the period.

Enrollment limit per period: Limit 7/period for Weeks 1, 5, and 9; 4/period for Weeks 13, 17, and 21; and 2/period for Weeks 25, 29, 33, 37, and 41. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The purpose of the "Honors Medicine" elective (subinternship) is the development of expertise in the care of hospitalized patients in a well-supervised teaching environment. Subinterns act as their patients' interns under the supervision of residents and attending physicians. Subinterns have the same on-call and admitting schedules as the interns on their teams and are assigned up to two new patients on each admitting day. Because of a lack of appropriate call rooms, subinterns are not required to spend call nights in the hospital. Except in emergencies, subinterns are the first individuals to evaluate patients admitted to medical service teams. A diagnostic and therapeutic approach to the patient is planned in consultation with the resident. Subinterns assume primary responsibility for the daily care of their patients, under the supervision of resident and attending physicians. This includes evaluation on daily rounds, scheduling and obtaining results of diagnostic studies, planning therapy, making arrangements for care after discharge and communicating with patients and their families. Subinterns attend the same conferences as the house staff.

Student time distribution: Inpatient 90%, Conferences/Lectures 10%; Primary Care 50%, Subspecialty Care 50%

Major teaching responsibility: Attending, chief resident, and resident

Patients seen/weekly: 8-12

On call/weekend responsibility: Yes

#### **M25 805 RHEUMATOLOGY**

Instructor(s): Richard Brasington, M.D.; Leslie Kahl, M.D.; and Prabha Ranganathan, M.D., 454-7279

Location: Barnes-Jewish Hospital, 5C Center for Advanced Medicine

Elective Contact: Department secretary, 454-7279

Other Information: Students should contact the Rheumatology office, 454-7279 prior to first day for assignment.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students will be involved in the diagnostic work-up and management of patients with rheumatic illnesses including systemic lupus erythematosus, rheumatoid arthritis, vasculitis (polyarteritis, Wegener's, temporal arteritis), spondyloarthropathies (ankylosing spondylitis, Reiter's syndrome), osteoarthritis, gout and regional musculoskeletal problems. By working closely with a faculty member, fellows and medical residents, students become integral and active members of the rheumatology service for inpatient consultations and outpatient clinics at Barnes-Jewish Hospital. An emphasis is placed on the physical examination of joints and the musculoskeletal system, synovial fluid analysis, and interpretation of diagnostic tests and radiographs. Students attend a rheumatology conference held weekly. An extensive collection of self-study materials, including reprints, textbooks, slides and CD-ROM discs is available.

Student time distribution: Inpatient 40%, Outpatient 50%, Conferences/ Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attendings

Patients seen/weekly: ~25 per student

On call/weekend responsibility: None

#### **M25 807 HONORS MEDICINE - VA MEDICAL CENTER**

Instructor(s): Lewis R. Chase, M.D., 289-7030

Location: St. Louis Veterans Affairs Medical Center

Elective Contact: Lewis R. Chase, M.D., 289-7030



Other Information: Students meet in A701 VA Medical Center, 7:30 a.m. first day of elective.

Enrollment limit per period: 4

Valid start weeks for 4-weeks blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Subinternship in medicine offers practical experience in the care of patients. Subinterns are an integral part of the house staff team, working under the supervision of a resident and attending physician. Their responsibilities for patients assigned to them are similar to those of interns. Patients are followed by the subintern throughout all levels of care including ICU, telemetry, stepdown, and general wards. Subinterns take night call with their team and participate in the teaching conferences of the Department of Medicine.

Student time distribution: Inpatient 80%, Conferences/Lectures 20%; Subspecialty Care 100%

Major teaching responsibility: Single attending, chief resident and team resident

Patients seen/weekly: 6.8 on average

On call/weekend responsibility: Every fourth night

#### M25 809 HYPERBARIC MEDICINE AND PROBLEM WOUND MANAGEMENT

Instructor(s): John Davidson, M.D., and staff, 205-6818

Location: St. Luke's Hospital; Barnes- Jewish Hospital

Elective Contact: John D. Davidson, M.D., 205-6818 or pager 424-2626

Other Information: Interested students should contact Dr. John D. Davidson to discuss in what way this elective can be tailored to their particular interests and goals. Mini-electives of one to two weeks duration can be arranged. (PLEASE contact Dr. Davidson at 205-6818 three weeks prior to the first date of elective to try to tailor the elective as much as possible to your primary interests.)

Enrollment limit per period: 2

Valid start weeks for 2-week blocks are: Weeks 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, and 43.

The specialty of hyperbaric medicine centers on the use of oxygen under increased atmospheric pressure as a drug for the treatment of many disparate diseases and clinical problems. This elective allows a student to have an acquaintance with this technology, which has a definite role in a wide range of differing specialties including emergency medicine, otolaryngology, plastic and reconstructive surgery, military medicine, rheumatology, dermatology, oral surgery, radiation oncology, internal medicine, neurology and psychiatry, to name a few.

Since students going into these specialties do not need to learn about hyperbaric medicine in depth, but nevertheless would benefit by some exposure to it, we can arrange a mini-elective of one to two weeks duration. This "exposure elective" can be tailored to a student's special field of interest just as we attempt to do in the usual four-week program. Please call Dr. John D. Davidson for more information.

Student time distribution: Inpatient 3%, Outpatient 92%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: John D. Davidson, M.D., and Georgia Endicott, Chief Technician

Patients seen/weekly: 20

On call/weekend responsibility: Attending physician will call student regarding select cases

#### M25 810 GERIATRIC MEDICINE

Instructor(s): David Carr, M.D., 286-2700

Location: Washington University, Health Key Building

Elective Contact: David Carr, M.D., 286-2700

Other Information: Meet at the Division of Geriatrics office, Health Key Building, 4488 Forest Park Blvd., Suite 201, 9:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students will participate in patient care at the rehabilitation center, the skilled nursing facility Barnes-Jewish Extended Care in Clayton, the inpatient geriatric consultation service, the outpatient primary care and geriatric consultation center, and the acute care for the elderly (ACE) unit located at 3200 North Campus. Attendance at scheduled research and clinical conferences in geriatric medicine, memory and aging, geropsychiatry, and hospice meetings is also required.

Student time distribution: Inpatient 20%, Outpatient 80%; Primary Care 20%, Subspecialty Care 80%

Major teaching responsibility: Attendings  
Patients seen/weekly: 10-15  
On call/weekend responsibility: None

#### M25 811 CLINICAL INTERNAL MEDICINE - HOSPITALIST

Instructor(s): Mark Thelke, M.D., 747-1499

Location: Barnes-Jewish Hospital, South Campus

Elective Contact: Sharon Morgan, Course Coordinator, 747-1499

Other Information: Students meet at the South Campus office, 662B Wohl Hospital, 8:15 a.m. first day of elective. Sharon Morgan, Course Coordinator, 747-1499.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This course allows the student to work one-on-one with hospitalist physicians on a patient care team. The student acts as the intern under the direct supervision of the attending physician. Daily responsibilities include admission history and physicals, daily notes, and discharge summaries on assigned patients. S/he also will have the opportunity to perform indicated procedures on all patients on this service. Students are encouraged to participate in Department of Medicine conferences.

Student time distribution: Inpatient 95%, Conferences/Lectures 5%; Primary Care 100%

Major teaching responsibility: Group of four hospitalist attendings

Patients seen/weekly: 10

On call/weekend responsibility: None

#### M25 814 CLINICAL EMERGENCY MEDICINE, BARNES-JEWISH HOSPITAL

Instructor(s): Mark Levine, M.D. 362-6743, and Sanford Sineff, M.D., 362-7959

Location: Wohl Clinic

Elective Contact: Cora Sias, 747-4156, or Sanford Sineff, M.D., 362-7959

Other Information: Contact Emergency Medicine Division office at 747-4156, for scheduling one week prior to the rotation.

Enrollment limit per period: Limit 3/period for Weeks 1, 5, 9, 13, 17; and 6/period for Weeks 21, 25, 29, 33, 37, and 41

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This rotation offers practical experience in the evaluation and management of acutely sick and injured patients. Students will function as subinterns, initially evaluating their assigned patients and developing a plan for further diagnostic studies and therapy. They will report to a senior level resident or an attending physician. The student can expect to get an opportunity to perform a wide variety of procedural skills such as suturing, splinting, peripheral and central venous access, and cardiopulmonary resuscitation. Shifts will be eight hours and students will rotate between day, evening and night shifts, including weekend shifts, in order to gain maximum exposure to all types of emergencies. A core content of lectures will be provided. Students are offered the opportunity to ride with EMS and/or Arch, though this is optional and not required or evaluated. Students desiring a letter of recommendation from Dr. Larry Lewis, Chief of Emergency Medicine, must take this WUMS IV Emergency Medicine rotation.

Student time distribution: Outpatient 80%, Conferences/Lectures 20%; Primary Care 60%, Subspecialty Care 40%

Major teaching responsibility: Attendings and senior residents (PGY 3 & 4)

Patients seen/weekly: ~5 per shift

On call/weekend responsibility: Evenings and weekends; no on call

#### M25 821 INPATIENT CARDIOLOGY

Instructor(s): Andrew Kates, M.D., 362-1291; Craig Reiss, M.D.; Benico Barzilai, M.D.; Michael Beardslee, M.D.; Alan Braverman, M.D.; Keith Mankowitz, M.D.; and Srihari Thanigaraj, M.D.

Location: 4104 Queeny Tower

Elective Contact: Andrew Kates, M.D., 362-1292

Other Information: Students meet in Room 4104 Queeny Tower, 9:00 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students will participate as members of the Barnes-Jewish Cardiology at Washington University Consultative Team. They will be part of a team composed of faculty members, fellows, residents, and nurse specialists that sees a large population of cardiac patients and follows them through all aspects of their in-hospital care. Emphasis will be placed on physical examination and the interpretation of modern cardiac diagnostic tests in clinical decision making.  
Student time distribution: Inpatient 75%, Outpatient 15%, Conferences/ Lectures 10%; Primary Care 5%, Subspecialty Care 95%  
Major teaching responsibility: Attending and fellow  
Patients seen/weekly: 10-15  
On call/weekend responsibility: None

#### M25 822 HONORS MEDICINE - CARDIOLOGY

Instructor(s): Thomas De Fer, M.D., 362-8050

Location: Barnes-Jewish Hospital

Elective Contact: Yvonne McLaughlin, 362-8050

Other Information: Students will receive e-mail communication regarding when/where to report on the first day prior to the beginning of the period.

Enrollment limit per period: Limit 2/period for Weeks 1, 5, 9, 13, 17, 21, and 1/period for Weeks 25, 29, 33, 37, and 41.

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The structure and functioning of the "Honors Medicine-Cardiology" elective (subinternship) is very similar to the general medicine subinternship (M25 801). The basic purpose is to develop expertise in the care of hospitalized patients in a well-supervised teaching environment. The majority of patients admitted to the service will have a cardiology diagnosis as the main reason for admission. Some general medical problems will also be seen. All attendings on the service are cardiology subspecialists. Cardiology fellows act as the chief resident for the service on a monthly basis. Subinterns act as their patients' interns under the supervision of residents and attending physicians. Subinterns have the same on-call and admitting schedules as the interns on their teams and are assigned up to two new patients on each admitting day. Because of a lack of appropriate call rooms, subinterns are not required to spend call nights in the hospital. Except in emergencies, subinterns are the first individuals to evaluate patients admitted to medical service teams. A diagnostic and therapeutic approach to the patient is planned in consultation with the resident. Subinterns assume primary responsibility for the daily care of their patients, under the supervision of resident and attending physicians. This includes evaluation on daily rounds, scheduling and obtaining results of diagnostic studies, planning therapy, making arrangements for care after discharge and communicating with patients and their families. Subinterns attend the same conferences as the internal medicine house staff. There are also several conferences specific to the cardiology service.

Student time distribution: Inpatient 90%, Conferences/Lectures 10%; Primary Care 25%, Subspecialty Care 75%

Major teaching responsibility: Attending, chief resident, and resident

Patients seen/weekly: 8-12

On call/weekend responsibility: Yes

#### M25 823 CLINICAL CARDIOLOGY--VA HOSPITAL

Instructor(s): Wade Martin, M.D., 289-6329

Location: John Cochran VA Hospital

Elective Contact: Wade Martin, M.D., 289-6329

Other Information: Students should meet in Room B206, 2nd Floor, VA Hospital.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The major purpose of this elective in clinical cardiology at the John Cochran VA Hospital is to improve evaluation and management skills for diagnosis and treatment of important cardiovascular conditions such as coronary artery disease including acute myocardial infarction, congestive heart failure, hypertension, and valvular heart disease. The rotation is designed to be flexible enough to accommodate a wide variety of course objectives but includes the opportunity to participate in 1-3 outpatient clinics per week; 1-4 weeks of inpatient intensive care, telemetry, or cardiology consultation rounds; and ECG, stress testing, nuclear imaging, or echocardiographic reading sessions, cardiac catheterization and electrophysiologic procedures. The emphasis will be on improvement of the ability to diagnose and treat cardiovascular disease on the basis of information obtained from a

thorough history and physical examination that is integrated with data from appropriate highly targeted laboratory studies in a manner that optimizes patient outcome and minimizes risk and costs.  
Student time distribution: Inpatient 45%, Outpatient 55%, Conferences/ Lectures 5-10%; Primary Care 25%, Subspecialty Care 75%  
Major teaching responsibility: Attendings and fellows  
Patients seen/weekly: 20  
On call/weekend responsibility: Varies

#### M25 825 CARDIAC ARRHYTHMIAS AND ELECTROPHYSIOLOGY

Instructor(s): Timothy Smith, D.Phil., M.D., 454-7834  
Location: Barnes-Jewish Hospital, North Campus  
Elective Contact: Timothy Smith, M.D., or Yvonne O'Connell, 454-7834  
Other Information: Students meet in the Cardiology Division, 4th Floor Kingshighway Building, Barnes-Jewish Hospital, North Campus, 8:00 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This elective provides the student with exposure and teaching in the diagnosis and treatment of complex cardiac rhythm disturbances. Specifically, the student is expected to evaluate patients referred for evaluation and treatment of complex or life-threatening rhythm disturbances, unexplained syncope or sudden cardiac death. Rounds are made daily on hospitalized patients, and students are welcome to observe electrophysiologic studies or implantation of pacemakers and defibrillators. This elective also provides an intensive opportunity to learn clinical electrocardiography and the systematic use of anti-arrhythmic drugs. Finally, since patients with chronic, complex rhythm disturbances frequently have organic heart disease, a broad-based exposure to general cardiology is also part of this elective.

Student time distribution: Inpatient 80%, Outpatient 10% (optional), Conferences/Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attending physician

Patients seen/weekly: 2 new consults/day

On call/weekend responsibility: None

#### M25 827 HEART FAILURE/CARDIAC TRANSPLANTATION

Instructor(s): Joseph G. Rogers, M.D., 454-7009  
Location: Barnes-Jewish Hospital, North Campus, Suite 4455  
Elective Contact: Joseph G. Rogers, M.D., 454-7009  
Other Information: Students should page the attending physician, 8:00 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This rotation is intended to provide trainees with a comprehensive experience managing patients with advanced heart failure. In addition to daily rounds, trainees are invited to attend both heart failure and transplant clinics. Further, the curriculum is supplemented by a comprehensive syllabus that contains the critical literature pertinent to this patient population. The trainees will also have experience with the evaluation of patients for operative heart failure therapies and will have the opportunity to observe these surgical procedures.

Student time distribution: Inpatient 70%, Outpatient 10%, Conferences/ Lectures 20%; Subspecialty Care 100%

Major teaching responsibility: Attendings

Patients seen/weekly: 30

On call/weekend responsibility: None

#### M25 830 DERMATOLOGY

Instructor(s): Dermatology staff, 454-8622  
Location: 7705 Wohl Hospital  
Elective Contact: Rosemarie Brannan, 454-8622  
Other Information: Students should contact the Dermatology office (454-8622) prior to first day for room assignment.

Enrollment limit per period: 4

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The aim of this elective is to provide a guide for the student so that s/he is able to appreciate dermatology within the broader perspectives of medicine and biology. Emphasis will be placed on the dermatologic variations encountered in a normal physical examination of the skin, the identification of common skin diseases, dermatologic clues to systemic disease, as well as those dermatologic conditions that are life threatening. The student will participate in outpatient care in the Barnes-Jewish Hospital and affiliated clinics. Students will attend all clinical teaching rounds and conferences in addition to the basic science and cutaneous histopathology conferences.

Student time distribution: Inpatient 25%, Outpatient 50%, Conferences/ Lectures 25%; Specialty Care 100%

Major teaching responsibility: Course master for rotation, private attending and senior resident

Patients seen/weekly: 20-25

On call/weekend responsibility: None

#### M25 831 PEDIATRIC DERMATOLOGY

On call/weekend responsibility: None

Instructor(s): Susan Mallory, M.D., 454-2714

Location: 3N48 Children's Hospital

Elective Contact: Rosemarie Brannan, 454-8622

Other Information: Call 454-2714 prior to first day of elective. Reporting time is 7:45 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This clinical rotation will be available to students interested in dermatology, pediatrics or both. Students will follow the dermatology rotation (M25 830) with an emphasis on pediatric dermatology by attending pediatric dermatology clinics, seeing consults, etc. Enthusiastic students will have an opportunity to write up a case report if they wish, but need to notify Dr. Mallory before the course. Students can take either this elective or M25 830--not both.

Student time distribution: Inpatient 1%, Outpatient 74%, Conferences/Lectures 25%; Subspecialty Care 100%

Major teaching responsibility: Single attending

Patients seen/weekly: 50-100

#### M25 836 CLINICAL GASTROENTEROLOGY AND HEPATOLOGY

Instructor(s): Jeffrey S. Crippin, M.D., 454-8141

Location: Barnes-Jewish Hospital, East Pavilion

Elective Contact: Jeffrey S. Crippin, M.D., 454-8141

Other Information: Students meet in the Digestive Disease Clinical Center, street level East Pavilion, Barnes-Jewish Hospital, 8:00 a.m. first day of elective.

Enrollment limit per period: 4

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The GI Hepatology elective is integrated into a very active inpatient/outpatient and endoscopy service at Barnes-Jewish Hospital. Students will participate in the evaluation of inpatients and outpatients with a spectrum of gut and liver disorders, will make patient rounds with the faculty and fellows, and have responsibility for patients on whom consultations have been requested. In addition, they will observe biopsy, endoscopic, and intubation techniques and participate in outpatient clinic and GI conferences.

Student time distribution: Inpatient 50%, Outpatient 40%, Conferences/ Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attending and fellows

Patients seen/weekly: 12 new

On call/weekend responsibility: None

#### M25 838 MEDICINE CONSULT SERVICE

Instructor(s): Christopher Gutjahr, M.D., 362-1707

Location: Barnes-Jewish Hospital, South Campus  
Elective Contact: Patty Lotz, 362-1707  
Other Information: Students should meet in the Division of Hospital Medicine office, 15th Floor Queeny Tower, 8:30 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41. Two week rotations are also available.

The focus of the Medicine Consult Service elective is the evaluation and management of medically complex patients admitted to the hospital on non-medicine services. The issues involved with perioperative management are particularly stressed. The student will function as a member of the consult service team. Duties will include performing initial consultations and follow-up care under the supervision of a Hospital Medicine attending and a senior medical resident. Attendance at Department of Medicine and division conferences is encouraged.

Student time distribution: Inpatient 90%, Conferences/Lectures 10%; Primary Care 100%

Major teaching responsibility: Consult Service attending (from the Division of Hospital Medicine)

Patients seen/weekly: 10-15

On call/weekend responsibility: None

#### M25 844 HEMATOLOGY AND HEMOSTASIS

Instructor(s): Philip Majerus, M.D.; Morey Blinder, M.D.; and Stuart Kornfeld, M.D., 362-8801

Location: 8441 Clinical Sciences Research Building

Elective Contact: Morey Blinder, M.D., 362-8857

Other Information: Students meet in Barnes-Jewish Hospital North, 7900 Nursing Division, 8:00 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Activities planned include work-up of patients at Barnes-Jewish Hospital under the supervision of the hematology fellow and his staff consultant; attendance at clinical rounds three to five hours weekly; participation in out-patient clinics; experience in various procedures, especially blood and bone marrow morphology and in interpretation of coagulation tests. Weekly student rounds with a senior staff person.

Student time distribution: Inpatient 80%, Outpatient 10%, Conferences/Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attending and fellow

Patients seen/weekly: 3-5

On call/weekend responsibility: None

#### M25 847 BONE AND MINERAL DISEASES

Instructor(s): Roberto Civitelli, M.D.; Michael Whyte, M.D.; Reina Villareal, M.D.; Kathryn Diemer, M.D.; Antonella Rastelli, M.D.; and Dwight Towler, M.D., Ph.D

Location: Barnes-Jewish Hospital

Elective Contact: Michael Whyte, M.D., 872-8305 or 454-8410

Other Information: Students will meet in the Division of Bone and Mineral Diseases, 7th Floor Steinberg, Barnes-Jewish Hospital.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The course is designed to acquaint the student with the clinical, radiological and pathological manifestations of disorders of bone and mineral metabolism, their etiology and pathogenesis, and to expose him/her to current concepts of therapy. The student will see patients at Barnes-Jewish Hospital, St. Louis Children's Hospital and Shriners Hospital for Children.

Acquired and heritable bone diseases will be studied in the context of derangements of mineral homeostasis with emphasis on vitamin D and peptide hormone metabolism and skeletal formation and remodeling. The role of non-invasive methods for measuring bone mass in the diagnosis and management of skeletal diseases also will be stressed.

While students rotate through the Division of Bone and Mineral Metabolism, they will be asked to participate in the weekly divisional conferences. Faculty and medical students will present interesting cases for discussion or the students can present a pertinent topic they have researched during their rotation presenting the recent medical literature on topics related to bone metabolism, bone densitometry, and patient care issues involving osteoporosis, metabolic bone disease, Paget's disease, congenital bone diseases or other topics encountered during their clinical experience.

Responsibilities: Shriners Hospital Wednesday a.m./p.m. (Dr. Whyte); CAM BMD teaching service, Thursday; Bone Research Conference Friday 9 a.m. Brown Room; Bone Health Case Conference, 7101 Steinberg conference room, North Campus, Friday 11 a.m. or 3 p.m.

Student time distribution: Inpatient 5%, Outpatient 80%, Conferences/ Lectures 15%; Subspecialty Care 100%

Major teaching responsibility: Attendings

Patients seen/weekly: ~20

On call/weekend responsibility: None

#### M25 850 HEMATOLOGY AND ONCOLOGY IV

Instructor(s): Scot Hickman, M.D.; Ravi Vij, M.D.; and Vorachart Auethavekiat, M.D., 289-6308

Location: John Cochran VA Hospital

Elective Contact: Scot Hickman, M.D., 289-6308

Other Information: Students should contact Dr. Hickman prior to first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The student will have major inpatient and outpatient exposure to the management of the following: non-small cell and small cell lung cancer, carcinoma of the colon, prostate cancer, lymphoma and leukemia. A wide variety of more esoteric tumors and hematological pathology may be encountered. In addition to diagnosis, staging, and management, general oncological topics such as pain management, hypercalcemia of malignancy and malignant effusions will be discussed. The weekly schedule includes morphology sessions, multidisciplinary conferences and tutorial sessions with the student alone, which will require prior literature review.

Student time distribution: Inpatient 47.5%, Outpatient 47.5%, Conferences/Lectures 5%; Primary Care 25%, Subspecialty Care 75%

Major teaching responsibility: Attendings and some fellow teaching input as well

Patients seen/weekly: 25

On call/weekend responsibility: None

#### M25 855 CLINICAL INFECTIOUS DISEASES

Instructor(s): Victoria Fraser, M.D., 454-8215

Location: Barnes-Jewish Hospital, North Campus

Elective Contact: Cindy Waterman, 454-8214

Other Information: Students should contact Cindy Waterman at 454-8214 first morning of elective.

Enrollment limit per period: 6

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Study of patients with infectious diseases. The elective is designed to teach students the fundamentals of evaluating clinical problems in infection and formulating plans for workup and therapy. Students see consultations in infectious diseases in every part of Barnes-Jewish Hospital under the supervision of a faculty member who rounds with them every day. They work closely with medical residents and infectious disease fellows, follow their own patients and play an important role in their management. They are expected to read the literature about their patients and participate in clinical conferences. They attend teaching rounds and conferences and lectures in infectious diseases.

Student time distribution: Inpatient 90%, Conferences/Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Single attending and fellow

Patients seen/weekly: 15 new consults

On call/weekend responsibility: None

#### M25 865 INTENSIVE CARE MEDICINE - BARNES-JEWISH NORTH

Instructor(s): Stephen S. Lefrak, M.D., and staff, 454-7116

Location: Barnes-Jewish Hospital, North Campus  
Elective Contact: Stephen S. Lefrak, M.D., 454-7116  
Other Information: Students meet at the MICU (8th Floor Barnes-Jewish Hospital, North Campus), 9:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This elective in intensive care is offered in the Intensive Care Unit at Barnes-Jewish Hospital, North Campus. This unit has 10 intensive care beds providing intensive nursing care and life-support technology. The patients represent a mixture of patients with primarily medical problems. Patient care responsibility includes night call. In addition to patient responsibility, there are regularly scheduled conferences and attending rounds.

Student time distribution: Inpatient 100%; Subspecialty Care 100%

Major teaching responsibility: Attendings and residents

Patients seen/weekly: 8

On call/weekend responsibility: Every third night

#### M25 867 MEDICAL INTENSIVE CARE

Instructor(s): Marin Kollef, M.D., 454-8764

Location: Barnes-Jewish Hospital, South Campus

Elective Contact: Linda Brockman, 454-8764

Other Information: Students report to the Medical Intensive Care Unit, 8300 Barnes-Jewish Hospital, South Campus, 7:30 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This elective is offered as an opportunity to gain additional experience in acute, primary care medicine. The elective is an advanced course in patient care involving complex medical problems. Responsibilities involve working up new patients with the MICU team, case presentations and attendance at conferences. Conferences consist of attending rounds Monday through Saturday, radiology rounds Monday through Saturday, pulmonary conference and medical grand rounds on Thursday, and critical care conference once each month. Call schedule is every third night.

Student time distribution: Inpatient 90%, Conferences/Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attendings and residents

Patients seen/weekly: 3

On call/weekend responsibility: Yes

#### M25 870 ENDOCRINOLOGY, DIABETES AND METABOLISM

Instructor(s): Clay Semenkovich, M.D., and staff, 362-7617

Location: 8th Floor SW Tower, Barnes-Jewish South Campus

Elective Contact: Clay Semenkovich, M.D., or Karen Muehlhauser, 362-7617

Other Information: Students meet on 8th Floor SW Tower, Barnes-Jewish South Campus, 8:30 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students taking this elective see patients with endocrine and metabolic diseases in the Outpatient Consultation office and inpatients at Barnes-Jewish Hospital and the General Clinical Research Center. They will present these cases at formal rounds. They will also participate in informal rounds with the division and at divisional seminars. Extensive interaction with patients with diabetes and a diabetes education program are included, as is involvement with patients with thyroid, pituitary, adrenal, gonad, and metabolic bone disease, as well as lipid disorders. Ample opportunities will be provided for discussions of patient problems with the members of the division.

Student time distribution: Inpatient 20%, Outpatient 70%, Conferences/Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Faculty consultant for inpatients, individual faculty one-on-one for outpatients, and program director for both

Patients seen/weekly: 8-10

On call/weekend responsibility: Elective for students



#### M25 873 ONCOLOGY I

Instructor(s): Ramaswamy Govindan, M.D., 362-4819

Location: Siteman Cancer Center, CAM Building

Elective Contact: Nancy Ogle, 362-4819, nogle@im.wustl.edu

Other Information: Students meet on the 7th Floor, Siteman Cancer Center, CAM Building, 4921 Parkview Place, 8:30 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students will gain experience in the initial treatment of newly diagnosed malignancies and the outpatient management of oncology patients. Participation in multidisciplinary tumor conferences will stress a combined-modality approach to management, incorporating chemotherapy, radiotherapy and surgery. Students will see patients with a variety of malignancies, including lymphoma, myeloma, and tumors of the lung, breast, and colon. Management of hypercalcemia and other paraneoplastic syndromes, as well as cancer pain management will be covered.

Student time distribution: Outpatient 85%, Conferences/Lectures 15%; Subspecialty Care 100%

Major teaching responsibility: Oncology attendings and occasionally fellows

Patients seen/weekly: 30-50

On call/weekend responsibility: None

#### M25 876 EXERCISE PHYSIOLOGY/HEALTH MAINTENANCE

Instructor(s): Ali A. Ehsani, M.D.; John O. Holloszy, M.D.; and Ted Weiss, Ph.D., 362-2392

Location: Irene Walter Johnson Building, Room 421

Elective Contact: Lisa Patterson, secretary, 362-2392

Other Information: Students meet in 424B Irene Walter Johnson Building, 9:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start dates for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Includes performing and interpretation of exercise testing, assessment of functional capacity and measurement of oxygen uptake. Students will participate in the management of patients undergoing exercise training.

Student time distribution: Outpatient 99%, Conferences/Lectures 1%; Subspecialty Care 100%

Major teaching responsibility: Attending

Patients seen/weekly: 5

On call/weekend responsibility: None

#### M25 880 PULMONARY MEDICINE--BARNES-JEWISH HOSPITAL

Instructor(s): Daniel Rosenbluth, M.D., and staff, 454-8762

Location: 5th Floor Kingshighway Building, North Campus

Elective Contact: Lisa Wetzel, 454-8762

Other Information: Students should page Pulmonary Consult Fellow, 7:30 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students will acquire skills in the evaluation and management of patients with pulmonary diseases and in the interpretation of pulmonary function tests. They will gain experience in outpatient Lung Center and attend regular pulmonary and critical care medicine conferences.

Student time distribution: Inpatient 60%, Outpatient 20%, Conferences/ Lectures 20%; Subspecialty Care 100%

Major teaching responsibility: Multiple attendings, fellows, and residents

Patients seen/weekly: 20

On call/weekend responsibility: None

#### M25 882 PULMONARY MEDICINE--VA HOSPITAL

Instructor(s): Carlos Daughaday, M.D., 289-6306

Location: John Cochran VA Hospital

Elective Contact: Carlos Daughaday, M.D., 289-6306

Other Information: Students meet in B501 John Cochran VA Hospital, 8:30 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students will participate in several ambulatory care activities of the Pulmonary Section, including outpatient consultations of common respiratory disorders such as COPD, obstructive sleep apnea, lung cancer and tuberculosis, and follow-up of primary care patients with pulmonary disease. In addition, students will round in medical intensive care units, interpret pulmonary function tests, participate in bronchoscopy and attend scheduled teaching conferences of the Pulmonary Division.

Student time distribution: Inpatient 30%, Outpatient 50%, Conferences/ Lectures 20%; Subspecialty Care 100%

Major teaching responsibility: Several attendings

Patients seen/weekly: 6-10 (by student)

On call/weekend responsibility: None

#### M25 883 TRANSFUSION MEDICINE

Instructor(s): Lawrence Tim Goodnough, M.D., 362-1546

Location: Barnes-Jewish Hospital

Elective Contact: Donna Sprankle, 362-3186

Other Information: Students should preschedule their rotation with Dr. Goodnough. Students should meet Dr. Goodnough on the 2nd floor of Barnes Service Building, first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This elective is designed to introduce the student to the clinical aspects of blood banking and interventional hematology. The four-week elective will consist of regular didactic sessions with senior staff, teaching conferences, participation in daily clinical rounds and exposure to developing programs. The student will develop clinical skills in areas related to transfusion practice, blood conservation and evaluation of transfusion reactions. Complex hematologic diseases such as the coagulopathies and diseases that require apheresis will serve to instruct in current clinical practice along with evolving applications of interventional hematology, such as photopheresis and peripheral stem cell harvest for marrow transplantation.

Student time distribution: For July, November and March: Inpatient 50%, Conferences/Lectures 50%;

For remainder of year: Inpatient 100%; Subspecialty Care 100%

Major teaching responsibility: Attendings

Patients seen/weekly: 20-25

On call/weekend responsibility: Optional

#### M25 884 BONE MARROW TRANSPLANTATION AND STEM CELL BIOLOGY

Instructor(s): John F. DiPersio, M.D., Ph.D., 362-9339

Location: Bone Marrow Transplant Unit 13-100

Elective Contact: John F. DiPersio, M.D., Ph.D., or Diane Oliver, 454-8306

Other Information: Students meet in the Bone Marrow Transplant Unit, 8:30 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Intense four-week clinical rotation exposing interested fourth-year medical students to the clinical world of bone marrow transplantation and to the basic science of hematopoiesis and stem cell biology. Students will be primarily responsible for the care of autologous and allogeneic BMT recipients. In addition they will be exposed to methods of stem cell harvest, cryopreservation, and immunophenotyping. This rotation plans to provide motivated students with an ideal mix of clinical medicine and basic science.

Student time distribution: Inpatient 60%, Outpatient 20%, Conferences/ Lectures 20%; Subspecialty Care 100%

Major teaching responsibility: Attending on service as well as all BMT physicians

Patients seen/weekly: 10-20

On call/weekend responsibility: None

#### M25 885 OCCUPATIONAL/ENVIRONMENTAL MEDICINE

Instructor(s): Bradley Evanoff, M.D., M.P.H., 454-8638

Location: Barnes-Jewish Hospital, North Campus

Elective Contact: Bradley Evanoff, M.D., M.P.H., 454-8638

Other Information: Students should meet at 8302 Barnes-Jewish Hospital, North Campus, 9:00 a.m. first day of elective.

Enrollment limit per period: 1 (2, by special arrangement)

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41. (Students may take this elective for up to 8 weeks.)

This elective is designed to introduce students to both the clinical treatment and the prevention of work-related injuries and illnesses. Clinical activities will include the diagnosis and treatment of workers with illnesses due to chemical exposure and repetitive motion, as well as acute injuries. Preventive activities will include work site visits and intervention projects, as well as involvement with work site health promotion and policy making. Specific activities are flexible depending on the students' interests. Students are also urged to contact Dr. Evanoff if they wish to participate in research projects concerning the epidemiology of work-related diseases.

Students may elect to participate in the Interdisciplinary Environmental Clinic at Washington University. Based in the law school, the clinic involves interdisciplinary teams of students (law, engineering, environmental science) taking principal responsibility, under faculty supervision, for cases and projects on behalf of environmental and community organizations. The medical student(s) would assist clinic students by evaluating the human health impacts involved in one or more of the clinic's cases, and presenting such information to the client organization(s) and others. Among the cases on which medical students might participate are: (1) air pollution associated with proposed cement plant upwind of the St Louis metropolitan area; (2) lead poisoning of children in the City of St. Louis; (3) lead poisoning of children and long-term exposure of adults to lead and possibly other metals in Herculaneum, Missouri; (4) air and water pollution caused by concentrated animal feeding operations (factory farms) in northern Missouri. Students choosing this option will work with the Environmental Clinic staff and with Dr. Evanoff to evaluate and present evaluations of human health impacts of environmental exposures.

Student time distribution: Outpatient 20%, Conferences/Lectures 10%, Reading/Research 70%;

Subspecialty Care 100%

Major teaching responsibility: Attending

Patients seen/weekly: 10

On call/weekend responsibility: None

#### M25 887 CLINICAL CARDIOVASCULAR MEDICINE

Instructor(s): Thomas F. Martin, M.D., 573-308-1301

Location: Phelps County Regional Medical Center, Rolla, MO

Elective Contact: Thomas F. Martin, M.D., 573-308-1301

Other Information: Students should meet at Phelps County Regional Medical Center, 1000 W. 10th Street, Rolla, MO, 8:00 a.m. first day of elective. Ask Intensive Care Unit secretary to page Dr. Martin.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 25, 29, 33, and 37.

Clinical cardiology with some internal medicine in a rural setting. Room and board provided.

Student time distribution: Inpatient 50%, Outpatient 50%; Subspecialty Care 100%

Major teaching responsibility: Attending

Patients seen/weekly: 80

On call/weekend responsibility: None

#### M25 890 CLINICAL NEPHROLOGY

Instructor(s): Daniel Coyne, M.D., 362-7211

Location: Chromalloy American Kidney Center, Barnes-Jewish Hospital

Elective Contact: Yolanda Richardson, 362-7211

Other Information: Students meet in the Acute Dialysis Center, Division 14300, Barnes-Jewish Hospital, 9:00 a.m. first day of elective. Ask for the Renal Fellow on the Consult Service.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students assist in both the inpatient and outpatient areas to diagnose patients with acute and chronic renal failure, glomerulonephritis, and electrolyte disorders. The student is a full member of the inpatient renal consult service, diagnosing and treating patients with acute and chronic renal disease and electrolyte disorders. Students will learn electrolyte management, drug dosing, dialysis procedures and complications, kidney biopsy reading and the management of acute and chronic renal failure. Students are also encouraged to spend three half-days in the outpatient center rotating to the General Renal Clinics, the Renal Stone Clinic and the Transplant Clinic. Throughout the rotation, students work closely with two attendings and two renal fellows.

Student time distribution: Inpatient 80%, Outpatient 10%, Conferences/Lectures 10%; Primary Care 20%, Subspecialty Care 80%

Major teaching responsibility: Two attendings and two renal fellows

Patients seen/weekly: Four consults per week

On call/weekend responsibility: Saturday a.m. rounds desirable but not required

#### M25 893 ADULT ALLERGY AND CLINICAL IMMUNOLOGY

Instructor(s): H. James Wedner, M.D., 454-7937 or 454-7377

Location: 5002 Steinberg Pavilion, Barnes-Jewish Hospital, North Campus

Elective Contact: Amy Sleeter, 454-7376 or Kristy Smith, 454-7377

Other Information: Students meet in Room 5001, Steinberg Pavilion, Barnes-Jewish Hospital, North Campus, 8:00 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students will participate in the allergy consult service at Barnes-Jewish Hospital, North and South Campus. The student will serve as the primary allergy consult for inpatient and Emergency Room consultation and present each patient to the allergy fellows on call and the attending physician. Students will attend The Adult Allergy Clinic, Pediatric Allergy Clinic and the outpatient clinics at The Asthma & Allergy Center at Barnes-Jewish West County Hospital. Conferences on selected topics in allergy and clinical immunology will be held with the attending staff two to three afternoons a week.

Student time distribution: Inpatient 10%, Outpatient 75%, Conferences/ Lectures 15%; Subspecialty Care 100%

Major teaching responsibility: Attending and staff

Patients seen/weekly: 12

On call/weekend responsibility: Optional

#### M25 896 INTERDISCIPLINARY MUSCULOSKELETAL MEDICINE

Instructor(s): Leslie Kahl, M.D., 454-7257

Location: 6304 Kingshighway Building

Elective Contact: Robert Groszewski, 454-7279

Other Information: Students report to 6307 Kingshighway Building, 8:30 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This elective will present interdisciplinary musculoskeletal medicine in an ambulatory setting. Students will attend clinics and selected conferences in adult rheumatology, pediatric rheumatology, sports medicine/orthopaedics, osteoporosis/bone health, and physical medicine. A reading list will be provided.

Student time distribution: Outpatient 70%, Conferences/Lectures 30%; Subspecialty Care 100%.

Major teaching responsibility: Multiple attendings, occasionally a fellow

Patients seen/weekly: 15-20

On call/weekend responsibility: None

#### M80 809 AMBULATORY CARE-- JACQUELINE MARITZ LUNG CTR

Instructor(s): Daniel Rosenbluth, M.D., 454-8762

Location: Barnes-Jewish Hospital, North Campus, Lung Center, 3rd Floor

Elective Contact: Lisa Wetzel, 454-8762

Other Information: Students meet in the Lung Center, 8th Floor, CAM, North Campus, 8:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 17, 21, 25, 29, 33, 37, and 41.

The Jacqueline Maritz Lung Center houses the ambulatory care activities of the Divisions of Pulmonary Medicine, Thoracic Surgery, and Allergy/Immunology, as well as the pulmonary function laboratory. The student will rotate through (1) both general pulmonary and subspecialty clinics in Pulmonary Medicine (cystic fibrosis, transplantation, emphysema, etc.), (2) Thoracic Surgery new patient clinics, (3) Allergy/Immunology clinic, and (4) interpretation of pulmonary function tests. Chest imaging is also emphasized in the evaluation process. The rotation can be streamlined to meet areas of emphasis desired by individual students.

Student time distribution: Outpatient 100%, Conferences/Lectures 3-5 wk; Primary Care 15%, Subspecialty Care: 85%

Major teaching responsibility: Multiple attendings

Patients seen/weekly: 10 to ?

On call/weekend responsibility: None

## Research

### **(M25 900)**

Dana R. Abendschein, Ph.D., 9924 Clinical Sciences Research Building, 362-8925. Research in this basic science laboratory is focused on responses of the arterial wall to injury and on mediators of coagulation that may contribute to acute rethrombosis after coronary fibrinolysis and accelerated restenosis after coronary angioplasty. Current studies are designed to define the time after vessel injury that the luminal surface remains procoagulant, to define the molecular expression of determinants of procoagulant activity associated with the site of injury and their changes with time, and to determine whether agents that inhibit the activity of procoagulant moieties can alter vascular remodeling leading to decreased acute thrombosis and subsequent restenosis in animal models of vascular injury. Students will be expected to observe procedures in experimental animals, to participate in analyses of procoagulant moieties and vascular wall proteins, and to participate in weekly laboratory meetings.

John P. Atkinson, M.D., 10th Floor Clinical Sciences Research Building, 362-8391. A clinical research elective is offered in evaluation of patients with complement deficiency states and complex rheumatic disease syndromes.

Michael E. Cain, M.D., 4208 Steinberg Building, 747-3032. Delineation of mechanisms responsible for clinical arrhythmias, improved identification of patients at risk for developing sudden cardiac death, evaluation of new antiarrhythmic agents, evaluation of new antitachycardia pacing devices, signal-averaged ECGs and catheter ablation of arrhythmias.

Roberto Civitelli, M.D., 502-3 Yalem, and 7th Floor Steinberg Building, North Campus, 454-8408. The biology of cell-cell interactions and communication in bone via gap junctions and cell adhesion molecules. Function of connexins in transcriptional control of osteoblast differentiation, osteoclastogenesis, and mechano-transduction. Modulation of mesenchymal lineage allocation and osteogenic differentiation by cadherins and b-catenin signaling.

Philip E. Cryer, M.D., 552 Barnard Hospital, 362-7635. Studies of the physiology and pathophysiology of metabolic regulation in normal humans and patients with diabetes mellitus with a focus on hypoglycemia.

Nicholas O. Davidson, M.D., 910 CSRB North Tower, 362-2027. Nonalcoholic fatty liver disease (NAFLD). Our laboratory is interested in the molecular mechanisms of hepatic steatosis, and the pathogenesis of NAFLD. This is the most prevalent liver disease in the US, likely affecting a quarter of the population. We have generated genetically manipulated mouse strains that offer insights into the mechanisms of hepatic steatosis. The student would work as part of a team, designing and conducting experiments that will test hypotheses concerning the mechanisms and consequences of hepatic steatosis. These studies will primarily involve mouse genetics, examining the expression of candidate genes under a variety of nutritional and pharmacologic settings that modulate hepatic lipid metabolism. In addition we are using microarrays to study the spectrum of genetic changes that may predict the extent of hepatic lipid accumulation in patients with steatohepatitis. Our goal is to test

hypotheses using mouse genetics and to extend these studies to examine the same pathways in humans with NAFLD.

Thomas M. DeFer, M.D., tdefer@im.wustl.edu or defert@msnotes.wustl.edu, 6604 Wohl Hospital, 362-8050, Special Projects in Medical Education. Through special arrangement with and approval by the coursemaster, 4th year students will participate in special projects in medical education. Typical projects will require approximately four weeks to complete. These four weeks can occur consecutively (preferred) or be spread out somewhat as needed. Medical education projects should be aimed at improving the curriculum, student experience, and/or administration of the Internal Medicine Clerkship or the Subinternship. Interested students should contact the coursemaster via phone or e-mail to discuss the proposed project. Those who are interested but would like guidance in designing a project should also contact the coursemaster. This is open only to Washington University School of Medicine students.

Bradley Evanoff, M.D., M.P.H., 454-8638. Occupational medicine epidemiology research. My research involves the use of epidemiology methods to characterize associations between diseases and work-related exposures. I am also doing studies that evaluate the detection and treatment of work-related musculoskeletal diseases. During an elective in occupational medicine epidemiology research, students will learn how to use epidemiologic methods to investigate disease processes by working on a mutually agreed-on topic of interest related to occupational diseases. Other activities can include work site visits and intervention projects, as well as involvement with work site health promotion and policy making. Elective length is variable depending on individual circumstances. Please contact Dr. Evanoff to discuss this research.

Gregory I. Goldberg, Ph.D., 7740 Barnard, 362-8172. Role of secreted extracellular matrix metalloproteases in tissue remodeling. Structure and function of the metalloproteases.

Mitchell H. Grayson, M.D., 6615 Clinical Sciences Research Building, 454-7412. Dendritic cells in viral airway disease. Our laboratory is interested in understanding the recruitment of dendritic cells to murine airways and their subsequent effects on the immune response. In particular we are interested in the role that dendritic cells play in the generation of an asthmatic phenotype after viral infection. We use a murine viral model (Sendai virus) that generates changes in murine lung consistent with that seen in human asthma. Ongoing investigations include examining the phenotypic changes in dendritic cells in the murine airway following viral infection and the mechanisms underlying the recruitment and trafficking of these dendritic cells. Participants in this elective will learn cell culture, animal model, and flow cytometric techniques amongst others.

Richard W. Gross, M.D., Ph.D., 4525 Scott Avenue, East Building, 362-2690. Lipid mediators of signal transduction in the cardiovascular system. Characterization of regulatory mechanisms responsible for the liberation of lipid second messengers during cellular activation.

Marc R. Hammerman, M.D., 7704 Wohl Clinic, 362-8233. Studies characterizing the transplantation of kidney and pancreatic anlage as a means to "grow new organs" in the settings of end-stage chronic renal failure and diabetes mellitus.

John O. Holloszy, M.D., 2nd Floor West Building, 362-3506. The research in our laboratory deals with the roles of exercise in the prevention and reversal of abdominal obesity, insulin resistance and diabetes. Much of our research is directed to elucidation of the mechanisms by which exercise activates glucose transport and enhances insulin sensitivity in muscle. Our current research is focused on the signaling pathways by which exercise activates glucose transport and enhances insulin sensitivity in muscle.

Keith A. Hruska, M.D., 5th Floor McDonnell Pediatric Research Building, 286-2772. The research in the laboratory focuses on new therapies for chronic kidney disease, osteoarthritis and their complications. The mechanisms of action of these therapies for nephropathy, vascular calcification and renal bone disease are being analyzed, as are mechanisms enabling cartilage transplantation.

Stuart A. Kornfeld, M.D., 8th Floor Clinical Sciences Research Building, 362-8803. Synthesis, processing and sorting of glycoproteins, including lysosomal enzymes. Intracellular protein trafficking.

Sandor J. Kovacs, Ph.D., M.D., 4428 Kingshighway Building, 454-8097. For students with math, physics and engineering background. Cardiovascular biophysics research elective concentrates on physiologic modeling and comparison of model predictions to in vivo human data. Minimum of eight weeks of elective time.

Jack Ladenson, Ph.D., 362-3186. Development of monoclonal and single-chain antibodies for use in research and in diagnostic testing.

Marc S. Levin, M.D., Deborah C. Rubin, M.D., 922 Clinical Sciences Research Building, 362-8933, 362-8935. Students will be members of a collaborative research team headed by Drs. Levin and Rubin (Associate Professors, Department of Medicine) investigating the mechanisms underlying the intestinal adaptive response that occurs to compensate for loss of functional small intestine. The student will have the opportunity to learn basic molecular biology and physiology as it relates to small intestinal growth, development and function. Examples of techniques that are used in these studies include small animal surgery (mice and rats), molecular biological techniques including PCR, Northern blotting, vector construction for production of transgenic and knockout mouse models, in situ hybridization and immunohistochemistry.

Lawrence M. Lewis, M.D., 362-4362. Emergency Medicine Research Elective. This elective offers an opportunity to investigate a wide variety of clinical questions relevant to the practice of emergency medicine. Our current projects include: biomechanics and pathophysiology of mild traumatic brain injury, toxicology, outcomes based research in asthma and geriatric abdominal pain, and public policy issues including access to healthcare and ED overcrowding. A preceptor will assist students with literature review, study design and data analysis. Students with original research ideas will be encouraged to complete their work to the point of abstract presentation or manuscript preparation. Interested students should contact the Emergency Medicine Division (362-4362).

Philip W. Majerus, M.D., 8th Floor Clinical Sciences Research Building, 362-8801. Biochemistry of platelets, regulation of lipid metabolism in tissue culture; mechanism of platelet thrombus formation.

Jeffrey D. Milbrandt, M.D., Ph.D., 101 Biotechnology Center, 362-4650. We have several ongoing projects in our laboratory. 1) The biological function of the GFL family of neurotrophic factors (GDNF, neurturin, persephin and artemin) that signal through a receptor complex containing the Ret tyrosine kinase. These factors promote survival of multiple neuronal populations including dopaminergic neurons, which degenerate in Parkinson's disease, motor neurons, which are affected in Lou Gehrig's disease and most neurons of the peripheral nervous system. 2) The biological roles of Egr2/Nab2 in regulating the Schwann cell myelination program and how abnormal function of these transcription factors result in peripheral neuropathies. 3) The development of prostate cancer, especially the role of Egr1 in regulating the PIN to invasive carcinoma transition and the role of the Nkx3.1 homeodomain protein in tumor initiation.

Stanley Mislser, M.D., Ph.D., 815 Yalem Building, Barnes-Jewish Hospital, 454-7719. Stimulus-secretion coupling in endocrine cells (B-islet cells and adrenal chromaffin cells) examined using single-cell assays of secretion (capacitance measurements, amperometry).

Aubrey Morrison, M.D., 8843 Wohl Clinic, 454-8495. Post transcriptional control of the cyclooxygenase gene(s) by the lymphokines IL-1 and TNF. Interactions of RNA-binding proteins with the 3'-UTR of cyclooxygenase 2 mRNA and their effects on mRNA stability and translational efficiency are evaluated.

Jeremiah Morrissey, Ph.D., 602 Yalem Building, Barnes-Jewish Hospital, North Campus, 454-7464, e-mail: morrisse@imgate.wustl.edu. During fibrotic kidney disease and during the subtle fibrosis of the kidney with age there is the activation and inhibition of genes traditionally associated with tumor initiation and metastatic growth. In order to gain more global information concerning gene expression during renal disease progression and treatment, gene array analysis will be employed. Results will be integrated with known information in the progression and treatment of atherosclerotic disease and fibrotic disease of other organ systems.

Richard E. Ostlund, M.D., 8804 Wohl Hospital, 362-8286. Our laboratory focuses on the prevention and treatment of coronary heart disease by studying cholesterol absorption, detoxification and elimination from the body. Direct patient studies that use new stable isotopic cholesterol tracers and mass spectrometry techniques complement in vitro work on the biochemistry of cholesterol transport in cultured cells.

Curtis A. Parvin, Ph.D., Room 2435 Kingshighway Building, Barnes-Jewish Hospital, North Campus, 454-8436. The application of biostatistical theory to data analysis issues in laboratory medicine, with particular emphasis on statistical approaches to characterizing the performance and quality of laboratory tests.

M. Alan Permutt, M.D., 5th Floor Wohl Hospital, 362-8680. Studies of genetic susceptibility to diabetes in humans and experimental animal models through use of recombinant DNA techniques. Families with

multiple diabetic members are being characterized clinically, and diabetes genes are being mapped. Islet cDNA genes are being cloned and sequenced to define genes involved in insulin secretion. Mutations in genes are being defined with hereditary disorders of insulin secretion. An Islet B-cell Functional Genomics Center in the lab studies global gene expression profiles in health and disease.

Katherine Ponder, M.D., 8818 Cancer Science Research Building, 362-5188, Gene Therapy for Genetic Diseases. Our laboratory is interested in using gene therapy to treat genetic deficiencies such as lysosomal storage diseases and hemophilia B. We have developed a retroviral vector that can be efficiently delivered to the liver of mice and dogs, and results in expression that is sufficient to reduce most of the clinical manifestations of hemophilia B and Mucopolysaccharidosis VII. Current studies focus upon assessing the immunological consequences of gene therapy, and devising ways to block immune responses to the therapeutic gene when and if they occur. In addition, we are further testing the clinical effect of this gene therapy approach in these and other models of disease.

Samuel A. Santoro, M.D., Ph.D., 8849 Clinical Sciences Research Building, 362-3110. Research is aimed at defining the molecular mechanisms of cell-cell and cell-substrate adhesion. Investigations are centered on the structure, function and regulation of adhesion receptor molecules in platelet function, development and malignancy.

Gustav Schonfeld, M.D., 9900 Clinical Sciences Research Building, 362-7038. Molecular genetics and pathophysiology of low LDL syndromes. Studies employ human families, genome scans, positional cloning, genetically altered cells and mice.

Daniel P. Schuster, M.D., 4462 Clinical Sciences Research Building, 362-3776. Molecular imaging studies of the lung. Students will be introduced to murine and other animal models of lung injury and inflammation, techniques involving positron emission tomography and nuclear medicine, mathematical modeling and pulmonary physiology. Specific projects involving questions relevant to pulmonary edema, neutrophilic inflammatory lung disease, or pulmonary gene expression imaging will be assigned according to the student's individual interests. Students with any expertise in bioengineering or computer science are especially invited to apply.

Clay F. Semenkovich, M.D., 8th floor, Southwest Tower, 362-4454. Fatty acid metabolism and its role in atherosclerosis, diabetes, hypertension, and obesity. The modulation of respiratory uncoupling for the treatment of aging, obesity, and vascular disease.

Samuel L. Stanley, Jr., M.D., 7244 McDonnell Pediatric Research Building, 286-0432. Dr. Stanley's lab is interested in the host response to pathogens, including potential bioterrorism agents. Work in the laboratory has focused on developing models to better understand the immunopathogenesis of *E. histolytica* and shigella infections, and the design and evaluation of recombinant-antigen based vaccines to stimulate mucosal and parenteral immune responses against enteric pathogens. More recently, the laboratory has begun new studies focusing on poxvirus infections, performing translational research looking at the genetic basis for susceptibility to poxvirus infections.

Thomas H. Steinberg, M.D., 7105 McDonnell Pediatric Research Building, 362-9218. We study cell-cell communication mediated by gap junction proteins and P2 (purinergic) receptors. Specific models include bone cells (osteoblasts and osteoclasts), pancreatic islet cells, and macrophages. In addition we are investigating the mechanisms by which gap junction proteins and P2 receptors are involved in the coordination of calcium signaling among cells.

Douglas M. Tollefsen, M.D., Ph.D., 8th Floor Clinical Sciences Research Building, 362-8830. Biochemical and physiologic studies of the interactions of plasma protease inhibitors with coagulation proteases. The student will become acquainted with standard biochemical techniques, such as column chromatography, absorption spectroscopy and radioisotope methods, as well as in vivo thrombosis models in mice. Minimum of 12 weeks required.

John Turk, M.D., Ph.D., 6609 Wohl Clinic, 362-8190. Phospholipid signaling mechanisms in pancreatic islets. Experience in mass spectrometric analysis of complex lipids is available.

Herbert Virgin, M.D., Ph.D., 1754 West Building, 362-9223. We work on issues at the interface of virology and immunology by analyzing aspects of viral immunity, viral pathogenesis, and viral genetics that contribute to virulence and disease. We focus on latency and pathogenesis of herpes viruses.

H. J. Wedner, M.D., 5002 Steinberg Pavilion, Barnes-Jewish Hospital, North Campus, 454-7937 or 454-7377. Asthma Care in the Inner City. Students will participate in ongoing studies of the delivery of asthma care to inner-city children and adults. The emphasis will be on direct contact between the



asthmatic patients and the student, along with an asthma counselor.

H. J. Wedner, M.D., 5002 Steinberg Pavilion, Barnes-Jewish Hospital, North Campus, 454-7937 or 454-7377. Biology of pollen and fungal allergens. Our laboratory has been characterizing the important allergenic proteins from molds and pollen. The allergens are identified using skin test sensitive individuals, and the proteins are isolated and characterized by a combination of physiochemical and molecular biological techniques. These studies should lead to better forms of allergy immunotherapy. Students will participate in the isolation, characterization and modification of major allergens from a number of molds including *Epicoecum nigrum* and several pollens including those from white oak and *Parthenium hysterophorus*, a newly recognized allergen.

Samuel A. Wickline, M.D., 4402 Barnes-Jewish Hospital, 454-8635. Both clinical and basic research programs are offered in the area of cardiovascular bioengineering in association with the new Institute for Biological and Medical Engineering at Washington University. The Institute sponsors a graduate program in biomedical engineering, which is conducted as a joint venture between the medical school and the School of Engineering and Applied Science. Advanced imaging projects are available in: (1) cardiovascular magnetic resonance (Dr. Samuel Wickline, Director of Cardiovascular Magnetic Resonance Laboratory, 454-7459); (2) ultrasonics/physical acoustics (Dr. Samuel A. Wickline, Co-Director of Cardiovascular Division and Director of Medical Ultrasonics Laboratory, 454-8635); and (3) cardiovascular biophysics (Dr. Sandor Kovacs, Director of Cardiovascular Biophysics Laboratory, 454-8097). These laboratories feature quantitative approaches to determine the structure, organization and function of cardiovascular tissues with direct clinical applications in magnetic resonance imaging and echocardiography. The program in magnetic resonance imaging comprises assessment of cardiac function, flow, perfusion, angiography and mathematical modeling of stress-strain relationships. The ultrasound and acoustics program comprises ultrasonic tissue characterization of the structure and composition of heart and vascular tissues that reflect fundamental physical properties of materials. The cardiovascular biophysics program is concerned with development of noninvasive techniques useful for mathematical modeling of heart function. In each venue, clinical correlation and case studies are presented and clinical research with direct patient contact is stressed.

## Faculty

**KENNETH S POLONSKY, MBBCH** Head of The Department of Internal Medicine, Busch Professor of Medicine

**ELLIOT EFREM ABBEY, MD** Professor of Clinical Medicine

**CHARLES C ABEL, MD** Assistant Professor of Clinical Medicine

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**MELVIN J BUTLER** Instructor in Clinical Medicine  
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**CHARLES C NORLAND, MD** Professor Emeritus of Clinical Medicine  
**DEBORAH J NOVACK, MD, PHD** Assistant Professor of Medicine  
**SAMUEL R NUSSBAUM, MD** Professor of Clinical Medicine  
**MUHAMMAD AKRAM NYAZEE** Instructor in Clinical Medicine  
**LAMAR H OCHS, MD** Instructor Emeritus in Clinical Medicine  
**G PATRICK O'DONNELL, MD** Instructor in Clinical Medicine  
**GEORGE CHARLES OLIVER, MD** Professor Emeritus of Clinical Medicine  
**MARGARET OLSEN, PHD** Research Assistant Professor of Medicine  
**ROBERT F ONDER, JR, MD** Assistant Professor of Clinical Medicine  
**S. MICHAEL ORGEL, MD** Instructor in Clinical Medicine  
**MATTHEW J ORLAND, MD** Associate Professor of Clinical Medicine  
**DAVID WILLIAM ORTBALS, MD** Assistant Professor of Clinical Medicine  
**DANIEL ORY, MD** Assistant Professor of Medicine  
**RICHARD E OSTLUND, JR, MD** Professor of Medicine  
**THEODORE OTTI** Instructor in Clinical Medicine  
**EDGAR TURNER OVERTON** Instructor in Medicine  
**ROBERT F OWEN, MD** Instructor Emeritus in Clinical Medicine  
**VANI PACHALLA, MD** Instructor in Clinical Medicine  
**ROBERT C PACKMAN, MD, BS** Professor of Clinical Medicine  
**ROBERT PAINE, MD** Professor of Clinical Medicine

**INNA LEE PARK, MD** Instructor in Clinical Medicine

**CHARLES W PARKER, MD** Professor Emeritus of Medicine

**MARY L. PARKER, MD** Associate Professor Emerita of Clinical Medicine

**DAVID A PARKS, MD** Assistant Professor of Clinical Medicine

**DEBORAH L PARKS, MD** Associate Professor of Clinical Medicine

**CURTIS ALAN PARVIN, PHD** Associate Professor of Computer Science in Medicine

**YOGESH PATEL, MD** Instructor in Emergency Medicine in Medicine

**AMANULLAH PATHAN** Instructor in Clinical Medicine

**BRUCE PATTERSON, PHD** Research Associate Professor of Medicine

**SUSAN E PEARSON, DOST, PHD** Instructor in Clinical Medicine

**REBECCA D PECK, MD** Instructor in Clinical Medicine (Dermatology)

**WILLIAM A PECK, MD** Professor of Medicine

**STANFORD PENG, MD, PHD, BS** Assistant Professor of Medicine

**MARYBETH PEREIRA, MD** Associate Professor of Clinical Medicine

**JULIO E PEREZ, MD** Professor of Medicine

**LAURENCE F PERLSTEIN, MD** Instructor in Clinical Medicine

**MARSHALL ALAN PERMUTT, MD** Professor of Medicine

**JEFFREY PETERSEN, MD** Assistant Professor of Medicine (Dermatology)

**LINDA R PETERSON, MD** Assistant Professor of Medicine

**CHRISTINE T PHAM, MD** Assistant Professor of Medicine

**WILLIAM J PHILLIPS, MD** Assistant Professor of Clinical Medicine

**JAY FRANCIS PICCIRILLO, MD** Associate Professor of Medicine

**JOEL PICUS, MD, BS** Associate Professor of Medicine

**STEPHEN J PIEPER, MD** Instructor in Clinical Medicine

**JOHN A PIERCE, MD** Professor Emeritus of Medicine

**RICHARD A PIERCE, PHD** Research Associate Professor of Medicine

**HELEN PIWNICA-WORMS, PHD** Professor of Medicine

**DOUG POGUE, MD** Instructor in Clinical Medicine

**ROBERT FRANCIS POIRIER, MD** Instructor in Emergency Medicine in Medicine

**GREGORY POLITES** Instructor in Emergency Medicine in Medicine

**KATHERINE P PONDER, MD** Associate Professor of Medicine

**HARISH PONNURU, MD** Instructor in Clinical Medicine

**LEE S PORTNOFF, MD** Assistant Professor of Clinical Medicine (Dermatology)

**DANIEL E POTTS, MD** Associate Professor of Clinical Medicine

**JOHN A POWELL, MD** Assistant Professor of Clinical Medicine (Dermatology)

**DIANA A PRABLEK, MD** Instructor in Clinical Medicine

**LAWRENCE PRABLEK, MD** Instructor in Clinical Medicine

**SIMEON PRAGER, MD** Assistant Professor of Clinical Medicine

**CHANDRA PRAKASH, MD** Assistant Professor of Medicine

**DAVID J PRELUTSKY, MD** Assistant Professor of Clinical Medicine

**JOSEPH M PRIMROSE, MD** Assistant Professor of Emergency Medicine in Medicine

**MABEL LOUISE PURKERSON, MD** Professor Emerita of Medicine

**EDWARD PURO, MD, PHD** Instructor in Clinical Medicine

**JENNIFER QUARTAROLO, MD** Instructor in Medicine

**PATRICIA M QUINLEY, MD** Instructor in Clinical Medicine  
**ERIN K QUIRK, MD** Instructor in Medicine  
**ABDUL H QURESHI** Instructor in Clinical Medicine  
**SUSAN RACETTE, PHD** Assistant Professor of Medicine  
**SASANKA RAMANADHAM, PHD** Research Associate Professor of Medicine  
**PRABHA RANGANATHAN, MBBS** Instructor in Medicine  
**U. RAMAKRISHNA RAO, PHD** Research Associate Professor of Medicine  
**ANTONELLA LUISA RASTELLI, MD** Instructor in Medicine  
**GARY A RATKIN, MD** Associate Professor of Clinical Medicine  
**LEE RATNER, MD, PHD** Professor of Medicine  
**SANDEEP REDDY** Instructor in Medicine (Assistant Director, Medical Services)  
**JEFFREY T REED, MD** Instructor in Clinical Medicine (Dermatology)  
**DOMINIC REEDS, MD** Instructor in Medicine  
**SUSAN ROBINSON REEDS** Instructor in Clinical Medicine  
**LESTER T REESE, MD** Professor of Clinical Medicine (Dermatology)  
**MARGARET REIKER, MD, PHD** Instructor in Clinical Medicine  
**CRAIG K REISS, MD** Associate Professor of Medicine  
**JACQUELINE LEVY REISS, MD** Instructor in Clinical Medicine  
**MICHAEL W RICH, MD** Associate Professor of Medicine  
**LOIS F. RICHARD, MD, PHD** Instructor in Medicine  
**TERRENCE E RIEHL, PHD** Research Instructor in Medicine  
**ROBERT D RIFKIN, MD** Associate Professor of Medicine  
**DANIEL S RING, MD** Instructor in Clinical Medicine (Dermatology)  
**LISA B RING, MD** Instructor in Clinical Medicine (Dermatology)  
**HAROLD K ROBERTS, MD** Assistant Professor Emeritus of Clinical Medicine  
**PAUL ARTHUR ROBIOLIO, MD** Assistant Professor of Clinical Medicine  
**H. BRYAN ROGERS** Instructor in Clinical Medicine  
**JOSEPH G ROGERS, MD** Associate Professor of Medicine  
**SHARON ALICIA ROGERS** Research Instructor in Medicine  
**FELICE A ROLNICK, MD** Instructor in Clinical Medicine  
**DANIEL B ROSENBLUTH, MD** Associate Professor of Medicine  
**LISA R ROSS, MD** Assistant Professor of Clinical Medicine  
**WILLIE RAY ROSS, MD** Assistant Professor of Medicine  
**MARCOS ROTHSTEIN, MD** Associate Professor of Medicine  
**ERNEST TUTTLE ROUSE, III, MD** Instructor in Clinical Medicine  
**ERNEST T ROUSE, JR, MD** Professor Emeritus of Clinical Medicine  
**JEREMY ROWER, MD** Instructor in Clinical Medicine  
**DEBORAH C RUBIN, MD** Associate Professor of Medicine  
**MYRA L. RUBIO, MD** Instructor in Medicine  
**JENNIFER PRAH RUGER, PHD, MS** Research Assistant Professor of Medicine  
**BRENT E RUOFF, MD** Associate Professor of Emergency Medicine in Medicine  
**TONYA RUSSELL, MD** Assistant Professor of Medicine  
**JOSEPH F RUWITCH, JR, MD** Professor of Clinical Medicine  
**KENNETH J RYBICKI, MD, PHD** Instructor in Clinical Medicine



**ROSHAN I SABAR** Instructor in Clinical Medicine

**MEHRDAD SAEED-VAFA, MD** Instructor in Clinical Medicine

**SHABBIR H SAFDAR** Professor of Clinical Medicine

**JEFFREY E SAFFITZ, MD, PHD** Professor of Medicine

**KAORI A. SAKURAI** Instructor in Clinical Medicine

**LLEWELLYN SALE, JR, MD, BA** Professor Emeritus of Clinical Medicine

**CHRISTINE JOAN SALTER, MD, DC** Instructor in Clinical Medicine

**ROBERT J SALTMAN, MD** Associate Professor of Clinical Medicine

**NANDAKUMAR SAMBANDAM** Research Assistant Professor of Medicine (Pending Executive Faculty Approval)

**JOHN MARK SAMET, MD** Instructor in Clinical Medicine

**LAWRENCE E SAMUELS, MD** Instructor in Clinical Medicine (Dermatology)

**GUADALUPE SANCHEZ, MD** Instructor in Clinical Medicine (Dermatology)

**MARK STEVEN SANDS, PHD** Associate Professor of Medicine

**DANIEL JOSE SANTA CRUZ, MD** Instructor in Clinical Medicine

**EVELIO E. SARDINA, MD, PHD** Instructor in Clinical Medicine

**NAVINDER SAWHNEY, MD** Instructor in Medicine

**DEBRA SCARLETT** Instructor in Medicine (Dermatology)

**LAWRENCE R SCHACHT, MD** Instructor in Clinical Medicine

**JEAN SCHAFFER, MD** Associate Professor of Medicine

**RICHARD O. SCHAMP, MD** Instructor in Clinical Medicine

**SAMUEL E SCHECHTER, MD** Assistant Professor Emeritus of Clinical Medicine

**MARK SCHEPERLE, MD** Instructor in Clinical Medicine

**ALVIN K SCHERGEN, MD** Instructor in Clinical Medicine

**TANIA L SCHMID, MD** Instructor in Clinical Medicine

**ROBERT JAY SCHNEIDER, MD** Assistant Professor of Clinical Medicine

**GUSTAV SCHONFELD, MD** Samuel E Schechter Professor of Medicine

**MARIO SCHOOTMAN, PHD** Assistant Professor of Medicine

**ALEXANDER E SCHUETZ, MD** Instructor in Clinical Medicine

**PAUL SCHULTZ, MD** Instructor in Clinical Medicine

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**DAVID B SCHWARTZ, MD, PHD** Assistant Professor of Medicine

**MITCHELL G SCOTT, PHD** Clinical Research Assistant Professor of Medicine

**SARAH JEAN SEECK** Instructor in Medicine

**SUSUMU SEINO, MD, PHD** Adjunct Professor of Medicine

**DAVID SELTZER, MD** Instructor in Emergency Medicine in Medicine

**JAY R SELTZER, MD** Assistant Professor of Clinical Medicine

**CLAY F SEMENKOVICH, MD** Professor of Medicine

**ROBERTA SENGELMANN, MD** Assistant Professor of Medicine (Dermatology)

**ALOK SENGUPTA** Instructor in Emergency Medicine in Medicine

**ROBERT M SENIOR, MD** Dorothy R and Hubert C Moog Professor of Pulmonary Diseases in Medicine

**JOSEPH MICHAEL SERIA, MD** Instructor in Clinical Medicine

**JAMES F SERTL, MD** Instructor in Clinical Medicine

**ATUL S SHAH** Instructor in Clinical Medicine

**WILLIAM D SHANNON, PHD** Associate Professor of Biostatistics in Medicine  
**JOHN B SHAPLEIGH, II, MD** Instructor in Clinical Medicine  
**BURTON A SHATZ, MD** Professor of Clinical Medicine  
**GERALD STEPHEN SHATZ, MD** Assistant Professor of Clinical Medicine  
**VIDAL T. SHEEN, MD** Instructor in Clinical Medicine  
**DAVID M. SHEINBEIN, MD** Assistant Professor of Medicine (Dermatology)  
**MOUNIR M SHENOUDA** Instructor in Clinical Medicine  
**JAMES M SHIPLEY, PHD** Assistant Professor of Medicine  
**BERNARD L SHORE, MD** Professor of Clinical Medicine  
**ROBERT B SHUMAN, MD** Associate Professor of Clinical Medicine  
**SHERRY E SHUMAN, MD** Associate Professor of Clinical Medicine  
**BARRY ALAN SIEGEL, MD** Professor of Medicine  
**CHRISTINE A SIGMAN, MD** Instructor in Clinical Medicine  
**JAY R. SILVERSTEIN, MD** Instructor in Medicine  
**RANDY B SILVERSTEIN, MD** Instructor in Clinical Medicine  
**DAVID R SINACORE, PHD** Associate Professor of Medicine  
**ROBERT W SINDEL, MD** Instructor in Clinical Medicine  
**SANFORD S SINEFF, MD** Instructor in Emergency Medicine in Medicine  
**GARY SINGER, MD** Assistant Professor of Clinical Medicine  
**JASVINDAR SINGH, MD** Assistant Professor of Medicine  
**JAMES C SISK, MD** Associate Professor Emeritus of Clinical Medicine (Dermatology)  
**DONALD A SKOR, MD** Associate Professor of Clinical Medicine  
**EDUARDO SLATOPOLSKY, MD** Joseph Friedman Professor of Renal Diseases in Medicine  
**RAYMOND P SMITH, MD** Instructor in Clinical Medicine  
**TIMOTHY W. SMITH, MD, PHD** Assistant Professor of Medicine  
**ALLEN D SOFFER, MD** Instructor in Clinical Medicine  
**RAND WASHBURN SOMMER, MD** Associate Professor of Clinical Medicine  
**ROSS B SOMMER, MD, BA** Associate Professor Emeritus of Clinical Medicine  
**PABLO SOTO, MD** Instructor in Medicine  
**HANI CHARLES SOUDAH, MD, PHD** Assistant Professor of Clinical Medicine  
**WILLIAM F SOUTHWORTH, MD** Assistant Professor of Clinical Medicine  
**MICHAEL L SPEARMAN, MD** Instructor in Clinical Medicine  
**JOHN SPERTUS** Adjunct Professor of Medicine  
**ALAN R SPIVACK, MD** Assistant Professor of Clinical Medicine  
**ERIK CHRISTIAN STABELL, MD** Instructor in Clinical Medicine  
**SAMUEL LEONARD STANLEY, JR, MD** Professor of Medicine  
**PAUL M STEIN, MD** Associate Professor of Clinical Medicine  
**PHYLLIS K STEIN, PHD** Research Assistant Professor of Medicine  
**RICHARD IAN STEIN** Research Assistant Professor of Medicine (Pending Executive Faculty Approval)  
**THOMAS H STEINBERG, MD** Associate Professor of Medicine  
**WILLIAM F STENSON, MD** Professor of Medicine  
**SHEILA ANN STEWARTWIGGLESWORTH, PHD** Assistant Professor of Medicine  
**JAMES ANDREW STOKES, MD** Instructor in Clinical Medicine  
**JOSHUA M. STOLKER, MD** Assistant Professor of Medicine (Pending Executive Faculty Approval)

**CHRISTIAN D STONE, MD** Assistant Professor of Medicine  
**BRADLEY P STONER, MD, PHD** Associate Professor of Medicine  
**GREGORY A STORCH, MD** Professor of Medicine  
**STEPHEN P STORFER, MD** Instructor in Clinical Medicine  
**HAMSA SUBRAMANIAN** Instructor in Clinical Medicine  
**WALTON SUMNER, II, MD** Associate Professor of Medicine  
**RAMA SURESH** Instructor in Medicine  
**RUDEE SUWANNASRI, MD** Instructor in Clinical Medicine  
**ELZBIETA ANNA SWIETLICKI, PHD** Research Instructor in Medicine  
**ROSLYN K SYKES, PHD** Visiting Instructor in Medicine  
**BENJAMIN R TAN, MD** Assistant Professor of Medicine  
**DAVID TAN, MD** Instructor in Emergency Medicine in Medicine  
**MEGUMI TANIUCHI, MD, PHD** Associate Professor of Medicine  
**KONGSAK TANPHAICHITR, MD** Associate Professor of Clinical Medicine  
**ARNOLD S TEPPER, MD** Instructor in Clinical Medicine  
**WANDA T TERRELL, MD** Assistant Professor of Clinical Medicine  
**TERESA A TESSNER, PHD** Research Instructor in Medicine  
**SRIHARI THANIGARAJ, MD** Assistant Professor of Medicine  
**J. ALLEN THIEL, MD** Associate Professor of Clinical Medicine  
**MARK S THOELKE, MD, PHD** Assistant Professor of Medicine  
**ERIK P THYSEN, MD** Assistant Professor of Clinical Medicine  
**ALAN JAMES TIEFENBRUNN, MD** Associate Professor of Medicine  
**SHARON F TIEFENBRUNN, MD** Instructor in Clinical Medicine (Dermatology)  
**LAWRENCE S TIERNEY, MD** Instructor in Clinical Medicine  
**JEFFREY P TILLINGHAST, MD** Associate Professor of Clinical Medicine  
**GARRY S TOBIN, MD** Assistant Professor of Clinical Medicine  
**DOUGLAS M TOLLEFSEN, MD, PHD** Professor of Medicine  
**MICHAEL TOMASSON, MD** Assistant Professor of Medicine  
**DWIGHT A TOWLER, MD, PHD** Associate Professor of Medicine  
**ROBERT R TOWNSEND, MD, PHD** Associate Professor of Medicine (Pending Executive Faculty Approval)  
**ELIZABETH A TRACY, MD** Instructor in Clinical Medicine  
**SANDEEP TRIPATHY, MD, PHD** Instructor in Medicine  
**JASON TROBAUGH, D SC** Research Instructor in Medicine  
**CYNTHIA TROIANO, DOST** Instructor in Clinical Medicine  
**SERGUEI TROIANOVSKI, PHD** Associate Professor of Medicine (Dermatology)  
**ALICE W TROTTER, MD** Instructor in Clinical Medicine  
**ELBERT P TRULOCK, III, MD** Rosemary and I Jerome Flance Professor of Pulmonary Medicine in Medicine  
**DAVID J TUCKER, MD** Instructor in Clinical Medicine  
**DOLORES R TUCKER, MD** Assistant Professor of Clinical Medicine (Dermatology)  
**JOHN W TURK, MD, PHD** Professor of Medicine  
**PETER G TUTEUR, MD** Associate Professor of Medicine  
**JOHN H UHLEMANN, MD** Assistant Professor of Clinical Medicine (Dermatology)  
**ALI A. VALIKA** Instructor in Medicine  
**ALBERT LEE VAN AMBURG, III, MD** Assistant Professor of Clinical Medicine

**EMMANUEL A VENKATESAN** Instructor in Clinical Medicine

**IVELISSE ANN VERRICO, MD** Assistant Professor of Medicine (Pending Executive Faculty Approval)

**THOMAS MARK VESELY, MD, BS** Associate Professor of Medicine

**RAVI VIJ, MBBS** Instructor in Medicine

**ANITHA VIJAYAN, MD** Assistant Professor of Medicine

**DENNIS T VILLAREAL, MD** Assistant Professor of Medicine

**REINA VILLAREAL, MD** Assistant Professor of Medicine

**HERBERT W VIRGIN, IV, MD, PHD** Assistant Professor of Medicine

**OKSANA VOLSHTEYN, MD** Assistant Professor of Medicine

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**HARRY LEE WADSWORTH, MD** Instructor in Clinical Medicine

**ALAN D WAGGONER** Research Assistant Professor of Medicine

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**MATTHEW JOHN WALTER, MD** Instructor in Medicine

**MICHAEL J WALTER, MD** Assistant Professor of Medicine

**RICHARD COBURN WALTERS, MD** Instructor in Clinical Medicine (Dermatology)

**DAVID K. WARREN, MD** Assistant Professor of Medicine

**SCOTT P WASSERSTROM, MD** Instructor in Clinical Medicine

**AMY L. WATERMAN, PHD** Instructor in Medicine

**HUGH R WATERS, MD** Instructor Emeritus in Clinical Medicine

**JASON WEBER, PHD** Assistant Professor of Medicine

**H. JAMES WEDNER, MD** Professor of Medicine

**GARY J WEIL, MD** Professor of Medicine

**KATHERINE N WEILBAECHER, MD** Assistant Professor of Medicine

**CARLA JOY WEINHEIMER** Research Instructor in Medicine

**LEONARD B WEINSTOCK, MD** Associate Professor of Clinical Medicine

**ALAN N WEISS, MD** Professor of Medicine

**PETER DOUGLAS WEISS, MD** Instructor in Clinical Medicine

**ALVIN S WENNEKER, MD** Professor of Clinical Medicine

**DARREN E WETHERS, MD** Instructor in Clinical Medicine

**ALISON J WHELAN, MD** Associate Professor of Medicine

**NEIL HARRIS WHITE, MD** Professor of Medicine

**MICHAEL PETER WHYTE, MD** Professor of Medicine

**BURTON M WICE, PHD** Research Assistant Professor of Medicine

**CYNTHIA A WICHELMAN, MD** Assistant Professor of Emergency Medicine in Medicine

**SAMUEL A WICKLINE, MD** Professor of Medicine

**JOHN F WIEDNER, MD** Instructor in Clinical Medicine

**DEBORAH A WIENSKI, MD** Instructor in Clinical Medicine

**DENISE WILFLEY** Professor of Medicine

**CONSUELO WILKINS, MD** Assistant Professor of Medicine

**MICHAEL P WILLIAMS, PHD** Adjunct Instructor in Medicine  
**MONIQUE WILLIAMS** Instructor in Medicine  
**NANCY J WILLIAMS, MD** Instructor in Clinical Medicine  
**R. JEROME WILLIAMS, MD** Associate Professor of Clinical Medicine  
**WENDELL WILLIAMS, MD** Instructor in Clinical Medicine  
**GEORGE A WILLIAMS, III, MD** Assistant Professor of Clinical Medicine  
**CHRISTINE E WILMSEN CRAIG, MD** Instructor in Clinical Medicine  
**MONITA ELAINE WILSON, PHD** Research Assistant Professor of Medicine  
**DAVID WILLIAM WINDUS, MD** Associate Professor of Medicine  
**PATRICK M WINTER, PHD** Research Instructor in Medicine  
**KAREN WINTERS, MD** Assistant Professor of Medicine  
**KEITH FREDERIC WOELTJE** Associate Professor of Medicine (Pending Executive Faculty Approval)  
**EDWARD M WOLFE, MD** Instructor in Clinical Medicine (Dermatology)  
**GERALD WOLFF, MD** Assistant Professor of Clinical Medicine  
**JOHN A WOOD, MD** Associate Professor of Clinical Medicine  
**MICHELE C WOODLEY, MD** Assistant Professor of Clinical Medicine  
**MEGAN ELIZABETH WREN, MD** Assistant Professor of Medicine  
**JEFFREY M WRIGHT, MD** Assistant Professor of Clinical Medicine  
**XIAOBO WU, MD** Research Instructor in Medicine  
**HONG XIAN, PHD** Research Assistant Professor of Medicine  
**LINGFEI XU** Research Instructor in Medicine  
**KATHRYN AYAKO YAMADA, PHD** Research Associate Professor of Medicine  
**JOHN H.S. YANG, MD** Instructor in Medicine  
**KEVIN E YARASHESKI, PHD** Associate Professor of Medicine  
**FRANK C-P YIN, MD, PHD** Professor of Medicine  
**XIN YU, PHD** Research Assistant Professor of Medicine  
**PIN YUE, PHD, MS** Research Instructor in Medicine  
**ROGER D. YUSEN, MD** Assistant Professor of Medicine  
**JOHN F. ZALEWSKI** Instructor in Clinical Medicine  
**JOEL ZEFRIN** Instructor in Clinical Medicine  
**SHAOSONG ZHANG, MD, PHD** Research Assistant Professor of Medicine  
**ROBERT E ZIEGLER, MD, PHD** Assistant Professor of Clinical Medicine (Dermatology)  
**DEBORAH ZIMMERMAN, MD** Instructor in Clinical Medicine  
**HERBERT B ZIMMERMAN, MD** Assistant Professor of Clinical Medicine  
**GARY R ZUCKERMAN, DOST** Associate Professor of Medicine  
**JOHN MICHAEL ZYLKA, MD, PHD, MS** Instructor in Clinical Medicine

## **Department's Website**

<http://internalmed.wustl.edu/>

## **Department of Molecular Biology and Pharmacology**

Principles of pharmacology are taught as part of the second-year curriculum of medical school. This course elaborates essential concepts in pharmacology that provide the basis for understanding the mechanisms of drug action for individual classes of drugs discussed elsewhere in different blocks of a

newly integrated second-year curriculum.

Research in the department emphasizes application of the tools of genetics, molecular and cell biology, genomics and bio-organic chemistry to define mechanisms that regulate cell fate, differentiation and senescence, and to devise ways of modulating these processes in vivo. A principal focus is on developmental biology using a series of genetically manipulable model organisms. Students participate with the staff in a series of weekly journal clubs discussing recent papers in the literature as well as their own work and that of their colleagues.

## **Courses**

### ***Second Year***

#### **M70 670A PRINCIPLES OF PHARMACOLOGY**

Instructor: Douglas F. Covey, Ph.D., 362-1726

The purpose of this course is to provide basic information relating to the underlying principles that apply to pharmacology. Topics addressed include: mechanisms of receptor-mediated drug action, pharmacokinetics, drug metabolism, toxicology, developmental pharmacology and the autonomic nervous system. Students who have not completed the first year of the medical school curriculum must have permission from the coursemaster to enroll in this course.

## **Research**

### ***FOURTH YEAR***

#### ***(M70 900)***

#### **Cross-listed with L41 (Bio) 590**

Irving Boime, Ph.D., 3rd Floor McDonnell Science Building, 362-2556. Regulated expression of human placental and pituitary glycoprotein hormone genes.

Ross L. Cagan, Ph.D., 3rd Floor South Building, 362-7796. Cell fate specification, including initiation and programmed cell death, in the developing *Drosophila* retina.

Douglas F. Covey, Ph.D., 3rd Floor McDonnell Science Building, 362-1726. Medicinal chemistry of steroids.

George W. Gokel, Ph.D., 3rd Floor McDonnell Science Building, 362-9297. Novel synthetic organic compounds for use as model systems for biological processes, especially pore formation in bilayers, membrane structure and interactions, and alkali metal cation- $\pi$  interactions.

Jeffrey I. Gordon, M.D., 5th Floor 4444 Forest Park, 362-7243. Gut development; host-microbial interactions in the mouse gastrointestinal ecosystem.

Gregory A. Grant, Ph.D., 4th Floor Biotechnology Science Building, 362-3367. Mechanism of allosteric regulation in enzymes.

Eugene M. Johnson, Jr., Ph.D., 3rd Floor McDonnell Science Building, 362-3926. Biology of neurotrophic factors and mechanisms of neuronal programmed cell death.

Kerry Kornfeld, M.D., Ph.D., 3rd Floor Cancer Research Building, 747-1480. Signal transduction during development. Aging.

Jeanne M. Nerbonne, Ph.D., 3rd Floor McDonnell Science Building, 362-2564. Regulation of membrane excitability; structure, function and regulation of voltage-dependent ion channels.

David M. Ornitz, M.D., Ph.D., 3rd Floor South Building, 362-3908. Regulation of organogenesis in the mouse by members of the fibroblast growth factor family. Genes involved in the development of the vestibular system.

John H. Russell, Ph.D., 3rd Floor McDonnell Science Building, 362-2558. Mechanisms of cell death in the regulation and function of lymphocyte response and pathogenesis in models of multiple sclerosis.

## Faculty

**JEFFREY I GORDON, MD** Head of the Department of Molecular Biology and Pharmacology, Dr Robert J Glaser Distinguished University Professor of Molecular Biology and Pharmacology

**CAROLYN J ANDERSON, PHD** Associate Professor of Molecular Biology and Pharmacology

**THOMAS J BARANSKI, MD, PHD** Assistant Professor of Molecular Biology and Pharmacology

**MONICA BESSLER, MD, PHD** Associate Professor of Molecular Biology and Pharmacology

**IRVING BOIME, PHD** Professor of Molecular Biology and Pharmacology

**WALTER A BOYLE, III, MD** Assistant Professor of Molecular Biology and Pharmacology

**ROSS CAGAN, PHD** Associate Professor of Molecular Biology and Pharmacology

**SHIMING CHEN, PHD** Research Instructor in Molecular Biology and Pharmacology

**ZHOUFENG CHEN, PHD** Assistant Professor of Molecular Biology and Pharmacology

**RICHARD A CHOLE, MD, PHD** Professor of Molecular Biology and Pharmacology

**DOUGLAS FLOYD COVEY, PHD** Professor of Molecular Biology and Pharmacology

**CHARLES M CROWDER, MD, PHD** Associate Professor of Molecular Biology and Pharmacology

**NICHOLAS O DAVIDSON, MD** Professor of Molecular Biology and Pharmacology

**AARON DIANTONIO, MD, PHD** Assistant Professor of Molecular Biology and Pharmacology

**ALEX S EVERS, MD** Professor of Molecular Biology and Pharmacology

**GEORGE W GOKEL, PHD** Professor of Molecular Biology and Pharmacology

**JUDITH P GOLDEN, PHD** Instructor in Molecular Biology and Pharmacology

**GREGORY ALAN GRANT, PHD** Professor of Molecular Biology and Pharmacology

**RICHARD WARREN GROSS, MD, PHD** Professor of Molecular Biology and Pharmacology

**ROBERT O HEUCKEROTH, MD, PHD** Assistant Professor of Molecular Biology and Pharmacology

**DAVID MICHAEL HOLTZMAN, MD** Professor of Molecular Biology and Pharmacology

**RICHARD S HOTCHKISS, MD** Professor of Molecular Biology and Pharmacology

**F. EDMUND HUNTER, PHD** Professor Emeritus of Molecular Biology and Pharmacology

**STACEY S. HUPPERT, PHD** Instructor in Molecular Biology and Pharmacology

**SHIN-ICHIRO IMAI, MD, PHD** Assistant Professor of Molecular Biology and Pharmacology

**EUGENE MALCOLM JOHNSON, JR, PHD** Professor of Molecular Biology and Pharmacology

**DANIEL P KELLY, MD** Professor of Molecular Biology and Pharmacology

**DAVID M KIPNIS, MD** Professor of Molecular Biology and Pharmacology

**RAPHAEL KOPAN, PHD** Professor of Molecular Biology and Pharmacology

**STEPHEN K KORNFELD, MD, PHD** Associate Professor of Molecular Biology and Pharmacology

**KRISTEN KROLL, PHD** Assistant Professor of Molecular Biology and Pharmacology

**LOON-TZIAN LO** Instructor in Molecular Biology and Pharmacology

**FANXIN LONG, PHD** Assistant Professor of Molecular Biology and Pharmacology

**HOWARD MCLEOD, PHS** Associate Professor of Molecular Biology and Pharmacology

**JASON C MILLS, MD, PHD** Assistant Professor of Molecular Biology and Pharmacology

**AUBREY R MORRISON, MBBS** Professor of Molecular Biology and Pharmacology

**LOUIS MUGLIA, MD, PHD** Associate Professor of Molecular Biology and Pharmacology

**PHILIP NEEDLEMAN, PHD** Adjunct Professor of Molecular Biology and Pharmacology

**JEANNE M NERBONNE, PHD** Alumni Endowed Professor of Molecular Biology and Pharmacology

**ARTHUR H NEUFELD, PHD** Professor of Molecular Biology and Pharmacology  
**DAVID M ORNITZ, MD, PHD** Alumni Endowed Professor of Molecular Biology and Pharmacology  
**BRIAN A. PIERCHALA, PHD** Instructor in Molecular Biology and Pharmacology  
**DAVID R PIWNICA-WORMS, MD, PHD** Professor of Molecular Biology and Pharmacology  
**JOHN HALL RUSSELL, PHD** Professor of Molecular Biology and Pharmacology  
**SCOTT SAUNDERS, MD, PHD** Assistant Professor of Molecular Biology and Pharmacology  
**JEAN SCHAFFER, MD** Associate Professor of Molecular Biology and Pharmacology  
**ALAN L SCHWARTZ, MD, PHD** Professor of Molecular Biology and Pharmacology  
**THEODORE C SIMON, PHD** Assistant Professor of Molecular Biology and Pharmacology  
**ERICA D SONNENBURG** Instructor in Molecular Biology and Pharmacology  
**THADDEUS S. STAPPENBECK, MD, PHD** Assistant Professor of Molecular Biology and Pharmacology  
**DWIGHT A TOWLER, MD, PHD** Associate Professor of Molecular Biology and Pharmacology  
**SERGUEI TROIANOVSKI, PHD** Associate Professor of Molecular Biology and Pharmacology  
**RUSSELL N VAN GELDER, MD, PHD** Assistant Professor of Molecular Biology and Pharmacology  
**MICHAEL J WELCH, PHD** Professor of Molecular Biology and Pharmacology  
**DAVID B WILSON, MD, PHD** Associate Professor of Molecular Biology and Pharmacology

## Department's Website

<http://molecool.wustl.edu/>

## Department of Molecular Microbiology

The Department of Molecular Microbiology teaches introductory courses in microbiology and pathogenic microorganisms for first-year medical students and graduate students. The department also offers a number of advanced courses, primarily designed for graduate students, but open to medical students. Advanced elective research activities are offered by faculty in the department.

## Courses

### ***First Year***

#### **M30 526 MICROBES AND PATHOGENESIS**

Instructor: Henry V. Huang, Ph.D., 362-2755

The challenge of this course is to emphasize the importance of understanding molecular and cellular paradigms of how pathogenic microbes interact with their hosts and cause disease. Selected pathogenic microbes, including bacteria, viruses, parasites and fungi, will be utilized as models to explain general principles of host-pathogen interactions and their consequences. Mechanisms by which microbes evade host defenses to cause acute and chronic infections will be highlighted. Problems facing the medical community in the 21st century such as rising antibiotic resistance and tropical diseases will be addressed. The main objective of this course is to teach students how to think about microbial pathogenesis in a way that will provide them a conceptual framework that relates mechanisms of pathogenesis to symptomology and pathophysiology.

### **Selectives**

#### **M04 526 NEW DISEASES, NEW PATHOGENS**

Instructor: David B. Haslam, M.D., 454-6050

This selective will focus on the process by which new etiologic agents of disease have been discovered. Special attention will be paid to the logical process by which a causative role is attributed to a newly discovered pathogen. This selective will also focus on understanding the process of identification and characterization of virulence determinants. Examples will be taken from bacterial, protozoan, viral and fungal pathogens.



## M04 533 TROPICAL MEDICINE

Instructor: Daniel E. Goldberg, M.D., Ph.D., 362-1514

Washington University has several faculty members who are actively researching diseases specific to developing countries. This elective is designed to bring these individuals together, in an informal discussion forum with students, to highlight the problems particular to geographical medicine. The elective will cover issues including eradication, prevention and treatment, immunology and vaccine development, as well as description of the different disease syndromes themselves. This selective is cross-listed in Department of Medicine.

## **Fourth Year**

### **Electives**

At present, the primary enrollees in the following courses are students working for a Ph.D. degree in one of the basic sciences. However, these courses are recommended for interested medical students, especially those who may be considering a career in medical research, such as MSTP students. Emphasis is placed on the organization and function of living systems at the molecular level. The courses combine formal lectures with student-directed seminars. Course descriptions are presented under Division of Biology and Biomedical Sciences.

L41 (Bio) 5217 SPECIAL TOPICS IN MICROBIAL PATHOGENESIS

L41 (Bio) 5392 MOLECULAR MICROBIOLOGY AND PATHOGENESIS

*Note — The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences.*

### **Research**

#### **(M30 900)**

#### **Cross-listed with L41 (Bio) 590**

John P. Atkinson, M.D., 10th Floor Clinical Sciences Research Building, 362-8391. Binding to and signaling by microbes to human complement receptors and regulatory proteins (lab-based project) or chart-based analysis of a group of patients with vasculitic syndromes (clinical project).

Douglas E. Berg, Ph.D., 8th Floor McDonnell Pediatric Research Building, 362-2772. *Helicobacter pylori*: mechanisms of gastric colonization and disease; bacterial genetic diversity and individual host specificity; mechanisms and evolutionary costs of drug resistance; molecular epidemiology and evolution.

Stephen M. Beverley, Ph.D., 9th Floor McDonnell Pediatric Research Building, 747-2630. Molecular genetics of protozoan parasites and tropical diseases; biosynthesis of the parasite surface, genomics, virulence and drug action or resistance.

Michael Caparon, Ph.D., 10th Floor McDonnell Pediatric Research Building, 362-1485. Molecular genetics and pathogenicity of the streptococci and other pathogenic gram positive bacteria.

Josephine Clark-Curtiss, Ph.D., 317 Rebstock Hall, 935-6869. Genetics and molecular studies on the pathogenesis of *Mycobacterium tuberculosis* and *Mycobacterium avium*.

Michael S. Diamond, M.D., Ph.D., 7th Floor McDonnell Pediatric Research Building, 362-2842. The research in our laboratory focuses on the interface between viral pathogenesis and the host immune response. Two globally important mosquito-borne RNA viruses are studied, the West Nile encephalitis and Dengue hemorrhagic fever viruses. Studies with Dengue virus (DV) have focused on identifying the host and viral factors that modulate the severity of an infection. Another direction for the laboratory is the investigation of the pathogenesis of West Nile virus infection (WNV) and the immune system response that prevents dissemination in the central nervous system. By infecting genetically and functionally immunodeficient mice with WNV, cells and molecules of the immune system are identified that are essential to the resolution of viral infection.

Tamara L. Doering, M.D., Ph.D., 10th Floor McDonnell Pediatric Research Building, 747-5597. The Doering lab studies the opportunistic fungal pathogen, *Cryptococcus neoformans*. We focus on synthesis of the main virulence factor of this organism, its polysaccharide capsule, with the dual

motivations of elucidating basic biology and identifying potential drug targets. Current approaches include those of biochemistry, cell and molecular biology.

M. Wayne Flye, M.D., Ph.D., 5108 Queeny Tower, 362-7145. Biochemical and gene regulation of local and systemic immune responses by the environment and cells of the liver and gastrointestinal tract with particular attention to the Kupffer cell.

Daniel Goldberg, M.D., Ph.D., 9th Floor McDonnell Pediatric Research Building, 362-1514. Biochemistry of malaria.

William Goldman, Ph.D., 10th Floor McDonnell Pediatric Research Building, 362-2742. Molecular basis of pathogenicity of *Histoplasma capsulatum*, *Bordetella pertussis*, and *Yersinia pestis*. In vitro models of respiratory tract infections and toxin effects. Biochemical analysis and genetic manipulation of virulence-related phenotypes.

Eduardo A. Groisman, Ph.D., 8th Floor McDonnell Pediatric Research Building, 362-3692. Signal transduction and regulation of gene expression. Molecular biology of bacteria-host interactions. Evolutionary origins of virulence.

David B. Haslam, M.D., 6th Floor McDonnell Pediatric Research Building, 286-2888. Our laboratory is investigating the trafficking of shiga toxin within human cells. In particular, we are examining the role of chaperones in the endoplasmic reticulum in toxin transport into the cytoplasm.

Henry Huang, Ph.D., 8th Floor McDonnell Pediatric Research Building, 362-2755. RNA virus evolution. Molecular biology of alphaviruses. Alphavirus gene expression vectors. Antiviral drug design.

Scott Hultgren, Ph.D., 10th Floor McDonnell Pediatric Research Building, 362-6772. Molecular basis of bacterial pathogenesis. Host-pathogen interactions and consequences. Urinary tract infections. Intracellular bacterial biofilms in infections. Pathogenic fiber formation and function in disease. Structural basis of chaperone/usher pathway, nucleation/precipitation pathway, amyloid, curli and pili. Vaccine development and drug design.

David Leib, Ph.D., 1108 McMillan, 362-2689. Molecular biology and latency of herpes simplex virus.

Hsiu-San Lin, M.D., Ph.D., Room A10, Center for Advanced Medicine, 362-8525. Differentiation and function of mononuclear phagocytes.

Jeffrey S. McKinney, M.D., Ph.D., 6105 McDonnell Pediatric Research Building, 286-2912. The molecular pathogenesis of *E. coli* and *Salmonella* infections. We employ novel RNA-based techniques of bacterial gene regulation to dissect host-pathogen interactions, using *E. coli* and *Salmonella* as model systems. We also study the diverse capabilities and functions of RNA in vitro and in vivo and are designing new RNA molecules amenable to in vitro evolution and to studies of RNA biology in bacteria.

Virginia L. Miller, Ph.D., 8th Floor McDonnell Pediatric Research Building, 286-2891. Molecular basis of pathogenicity of the enteric pathogens *Yersinia enterocolitica*, *Salmonella typhimurium*, and *Klebsiella pneumoniae*.

Andrew Pekosz, Ph.D., 8230 McDonnell Pediatric Research Building, 747-2132. Virology; molecular biology and pathogenesis of respiratory virus infections.

Lee Ratner, M.D., Ph.D., 562 McDonnell Sciences, 362-8836. Structure and function of human retroviruses, including HTLV-I, a cause of leukemia, and HIV, the cause of AIDS. The major focus is in studying the regulation of virus infectivity, replication, assembly and pathogenicity.

Robert Schreiber, Ph.D., 7th Floor Clinical Sciences Research Building, 362-8747. Biochemistry and biology of cytokines and their receptors. Elucidation of the signal transduction mechanisms used by interferon-gamma and tumor necrosis factor. Definition of the physiologic roles of cytokines in vivo especially with respect to host responses to tumors, and microbial pathogens.

L. David Sibley, Ph.D., 9th Floor McDonnell Pediatric Research Building, 362-8873. We are studying the intracellular survival mechanisms of protozoan parasites. Current approaches include high-resolution real-time microscopy, genetic mapping and genomic analyses.

Samuel L. Stanley, Jr., M.D., 7th Floor, McDonnell Pediatric Research Building, 362-1070. We study the protozoan parasite *Entamoeba histolytica*, the cause of amebic dysentery and amebic liver abscess, focusing on developing models to better understand the pathogenesis of amebic infection, novel targets for anti-amebic drug design, and the design and evaluation of recombinant antigen based vaccines to stimulate mucosal and parenteral immune responses against the parasite.

Joseph W. St. Geme, M.D., 6th Floor McDonnell Pediatric Research Building, 286-2887. The molecular mechanism of *Haemophilus influenzae* pathogenicity. *H. influenzae* is an important cause of human respiratory tract and systemic diseases and a source of substantial morbidity. We are principally interested in characterizing the bacterial and host cell determinants of *H. influenzae* interaction with respiratory epithelium, an essential early step in the pathogenesis of disease. We anticipate that these studies will assist efforts to develop a strategy for the universal prevention of *Haemophilus* disease and provide insights into other mucosal pathogens.

Gregory Storch, M.D., 2N52 St. Louis Children's Hospital, 454-6079. In this elective, the student will participate in a research project involving the application of techniques of molecular biology, especially the polymerase chain reaction and nucleotide sequencing, to the diagnosis of the infectious diseases. Infectious agents currently under investigation include human cytomegalovirus, Epstein-Barr virus, BK polyoma virus, *Ehrlichia*, *Mycoplasma pneumoniae*, and *Borrelia*. Studies are also directed at molecular detection and analysis of resistance to antimicrobial agents.

Patrick M. Stuart, Ph.D., 1215 McMillan, 362-6774. Virology. Investigate the role viral-induced immune responses play in corneal pathology seen in both primary and recurrent herpetic keratitis. To develop and characterize anti-herpetic vaccines as well as immunologically-based tolerance procedures that are effective in preventing recurrent herpetic keratitis.

Transplantation. Investigate the role that the interaction of Fas with Fas ligand plays in corneal allograft acceptance and neovascularization of the cornea. In addition, we are studying the role that this interaction plays in the development of immune tolerance that allows the immune system to ignore transplantation antigens leading to allograft acceptance.

Herbert Virgin, M.D., Ph.D., 1754 West Building, 362-9223. We work on issues at the interface of virology and immunology by analyzing aspects of immunity that control infection and aspects of viral structure/genetics that contribute to virulence, disease and oncogenesis. We study the pathogenesis and latency of the dsDNA enveloped murine cytomegalovirus and gammaherpesvirus 68.

Joseph P. Vogel, Ph.D., 10th Floor McDonnell Pediatric Research Building, 747-1029. *Legionella pneumophila*, the causative agent of Legionnaires' pneumonia, replicates inside alveolar macrophages by preventing phagosome-lysosome fusion.

## Faculty

**STEPHEN M BEVERLEY, PHD** Head of The Department of Molecular Microbiology, Marvin A Brennecke Professor of Molecular Microbiology

**NATALIA S AKOPYANTS, PHD, MS** Assistant Research Scientist of Molecular Microbiology

**JOHN PATTERSON ATKINSON, MD** Professor of Molecular Microbiology

**WANDY L. BEATTY, PHD** Research Instructor in Molecular Microbiology

**ABDERR AZZAQ BELAAOUAJ, PHD** Assistant Professor of Molecular Microbiology

**DOUGLAS E BERG, PHD** Alumni Professor of Molecular Microbiology

**KERIL J. BLIGHT, PHD** Assistant Professor of Molecular Microbiology

**TAMARA L. BRENT, MD, PHD** Assistant Professor of Molecular Microbiology

**MICHAEL G CAPARON, JR., PHD** Professor of Molecular Microbiology

**JOSEPHINE CLARK-CURTISS, PHD** Research Associate Professor of Molecular Microbiology

**SUSAN E CULLEN, PHD** Adjunct Professor of Molecular Microbiology

**MICHAEL DIAMOND, MD, PHD** Assistant Professor of Molecular Microbiology

**DEBORAH E DOBSON, PHD** Research Associate Professor of Molecular Microbiology  
**KAREN W DODSON, PHD** Instructor in Molecular Microbiology  
**WILLIAM MICHAEL DUNNE, JR., PHD** Associate Professor of Molecular Microbiology  
**LINDA G EISSENBERG, PHD** Instructor in Molecular Microbiology  
**JULIAN B FLEISCHMAN, PHD** Associate Professor Emeritus of Molecular Microbiology  
**M. WAYNE FLYE, MD, PHD, MA** Professor of Molecular Microbiology  
**DANIEL E GOLDBERG, MD, PHD** Professor of Molecular Microbiology  
**WILLIAM E GOLDMAN, PHD** Professor of Molecular Microbiology  
**EDUARDO GROISMAN, PHD** Professor of Molecular Microbiology, Howard Hughes Medical Institute Investigator in Molecular Microbiology  
**DAVID B HASLAM, MD** Assistant Professor of Molecular Microbiology  
**HENRY V HUANG, PHD** Associate Professor of Molecular Microbiology  
**SCOTT JAMES HULTGREN, PHD** Helen L Stoeve Professor of Molecular Microbiology  
**DAVID E KENNEL, PHD** Professor Emeritus of Molecular Microbiology  
**ANTHONY KULCZYCKI, JR, MD** Associate Professor of Molecular Microbiology  
**DAVID A LEIB, PHD** Associate Professor of Molecular Microbiology  
**HSIU-SAN LIN, MD, PHD** Associate Professor of Molecular Microbiology  
**JOHN RUSSELL LITTLE, JR, MD** Professor Emeritus of Molecular Microbiology  
**ELAINE RENE MARDIS, PHD** Assistant Professor of Molecular Microbiology  
**GERALD MEDOFF, MD** Professor of Molecular Microbiology  
**VIRGINIA LYNN MILLER, PHD** Professor of Molecular Microbiology  
**PAUL D OLIVO, MD, PHD** Adjunct Assistant Professor of Molecular Microbiology  
**ANDREW S. PEKOSZ, PHD** Assistant Professor of Molecular Microbiology  
**LEE RATNER, MD, PHD** Professor of Molecular Microbiology  
**CHARLES M RICE, III, PHD** Adjunct Professor of Molecular Microbiology  
**MILTON J SCHLESINGER, PHD** Professor Emeritus of Molecular Microbiology  
**SONDRA SCHLESINGER, PHD** Professor Emerita of Molecular Microbiology  
**ROBERT D SCHREIBER, PHD** Professor of Molecular Microbiology  
**DAVID A SCOTT** Instructor in Molecular Microbiology  
**LAURENCE DAVID SIBLEY, PHD** Professor of Molecular Microbiology  
**SAMUEL LEONARD STANLEY, JR, MD** Associate Professor of Molecular Microbiology  
**GREGORY A STORCH, MD** Professor of Molecular Microbiology  
**PATRICK MICHAEL STUART, PHD** Research Assistant Professor of Molecular Microbiology  
**JOSEPH W ST. GEME, MD** Professor of Molecular Microbiology  
**PHILLIP IRWIN TARR, MD** Professor of Molecular Microbiology  
**HERBERT W VIRGIN, IV, MD, PHD** Professor of Molecular Microbiology  
**JOSEPH VOGEL, PHD** Assistant Professor of Molecular Microbiology  
**DAVID WANG** Assistant Professor of Molecular Microbiology (Pending Executive Faculty Approval)  
**GARY J WEIL, MD** Associate Professor of Molecular Microbiology  
**WILLIAM ROBERT WIKOFF, PHD** Assistant Professor of Molecular Microbiology  
**RICHARD K WILSON, PHD** Professor of Molecular Microbiology

**Department's Website**

## **Department of Neurological Surgery**

Instruction in neurological surgery begins with an introduction to the anatomy and physiology of the nervous system presented in the first-year course in neural sciences directed by the Department of Anatomy and Neurobiology with participation of the neurosurgery faculty. In the second year, the Department of Neurological Surgery presents the course in Diseases of the Nervous System in conjunction with the Departments of Neurology, Pathology, Molecular Biology and Pharmacology, Medicine and Pediatrics. The course emphasizes how knowledge derived from basic or clinical investigations leads to improvements in clinical care. In the third year, students participate in a four-week clerkship in Neurology, which introduces students to the clinical care of patients with diseases of the nervous system. Neurosurgical faculty members also work with the neurologists in providing lectures, demonstrations and teaching exercises in patients with neurological diagnoses as part of the Clinical Medicine course. Some students may elect to fulfill their neurology requirement by rotating on the neurosurgery service. Neurosurgical diagnosis, critical care, operative treatment and ethical issues in patient management are emphasized. In the fourth year, students may choose from several advanced electives including clinical externships in neurosurgery and experiences in basic or clinical/translational research.

### **The Divisions within Neurological Surgery are:**

The James L. O'Leary Division of Experimental Neurology and Neurological Surgery: Thomas A. Woolsey, M.D. (Director)

The Division of Pediatric Neurosurgery: Jeffrey R. Leonard, M.D.; Matthew D. Smyth, M.D.; Tae Sung Park, M.D.

The Center for the Study of Nervous System Injury is based in the Department of Neurology with participation by neurosurgery faculty members, Ralph G. Dacey Jr., M.D.; Jeffrey M. Gidday, Ph.D.; Tae Sung Park, M.D.

The Center for Spinal Cord Injury (with Neurology)

### **Areas of Neurosurgical specialization include:**

Epilepsy Surgery: Joshua L. Dowling, M.D.

Cranial Base Surgery: Michael R. Chicoine, M.D.; Robert L. Grubb Jr., M.D.

Pituitary Surgery: Michael R. Chicoine, M.D.; Ralph G. Dacey Jr., M.D.

Neuro-Oncology: Michael R. Chicoine, M.D.; Ralph G. Dacey Jr., M.D.; Keith M. Rich, M.D.

Pediatric Neurosurgery: Jeffrey R. Leonard, M.D.; Matthew D. Smyth, M.D.; Tae Sung Park, M.D.

Cerebrovascular Surgery: Michael R. Chicoine, M.D.; Ralph G. Dacey Jr., M.D.; Robert L. Grubb Jr., M.D.; Keith M. Rich, M.D.

Spinal Neurosurgery: Paul Santiago, M.D.; Todd J. Stewart, M.D.; Neill M. Wright, M.D.

Stereotactic Radiosurgery: Michael R. Chicoine, M.D.; Ralph G. Dacey Jr., M.D.; Joshua L. Dowling, M.D.; Keith M. Rich, M.D.

Surgical Management of Pain: Joshua L. Dowling, M.D.

## **Courses**

### ***First Year***

#### **Selectives**

M04 5667 MICROCIRCULATION

Instructor: Jeffrey M. Gidday, Ph.D., 286-2795

The homeostatic functions of the microcirculation include the active regulation of metabolic substrate delivery and waste product removal, and a multifaceted response to injury and disease. This elective is an introduction to the normal and abnormal cell biology and physiology of the microcirculation. Four sessions will be organized around conceptual presentations and laboratory demonstrations by the instructor, and two-part, topic presentations by students following independent library research that focuses on basic physiology and clinically relevant pathophysiology. Basic physiology research topics might include: Regulation of tissue blood flow and vascular tone, propagated vasodilation, hemodynamics and rheology of erythrocytes and leukocytes, cell biology of the endothelium, control of capillary permeability, and angiogenesis. Common disease entities involving microcirculatory dysfunction include: stroke and myocardial ischemia, diabetes, inflammation, tumor angiogenesis, retinopathy of prematurity, pulmonary edema and autoimmune disease, as well as the adaptive cardiovascular responses to exercise or high altitude. (This selective is cross-listed in the Department of Cell Biology and Physiology.)

## ***Third Year***

### **Third Year Clerkship opportunities**

Up to two students may elect to obtain their neurology clerkship experience on the neurosurgery service or they can choose neurosurgery as part of the surgical specialty rotations. Third-year students participate with the residents and attendings on hospital rounds, evaluate patients in the neurosurgery outpatient department and participate in the neurosurgical operating room. The main objectives of the rotation include: 1) the evaluation of comatose or head-injured patients; 2) clinical presentation, diagnostic work-up and treatment of cervical and lumbar disc disease; and 3) evaluation and treatment of patients with hemorrhagic and ischemic stroke.

## ***Fourth Year***

### **Elective**

M40 805 NEUROSURGERY

Instructor(s): Ralph Dacey, Jr., M.D., 362-3571

Location: McMillan Hospital

Elective Contact: Ralph Dacey, Jr., M.D., 362-3571

Other Information: Students should contact Dr. Dacey prior to the first day of the elective.

Enrollment limit per period: 7

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The goal is to provide an overview of neurological surgery. Responsibilities will include patient workup, pre-, intra- and postoperative care, diagnostic procedures, daily resident and weekly grand rounds, clinics, Saturday morning lectures for Junior class, and weekly combined Neurology, Neurosurgery, and Neuropathology conferences.

Student time distribution: Outpatient 90%, Conferences/Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: N/A

Patients seen/weekly: 125

On call/weekend responsibility: None

### **Research**

#### ***(M40 900)***

Michael R. Chicoine, M.D., 5th Floor McMillan, 362-3414. The biology of brain tumors. One area of research focuses on the aggressive nature of certain meningiomas, including their tendency to invade the parenchyma of the brain, cranial nerves, cerebral arteries, dura and bone. The second area of research focuses on the invasive behavior of gliomas. Both of these research topics are investigated using human brain tumor tissue obtained at the time of neurosurgical operations.

Ralph G. Dacey, Jr., M.D., 5th Floor McMillan, 362-3571. Research on the cerebral microcirculation: Our studies focus on examination of molecular mechanisms in the endothelial cells and smooth muscle cells in the intracerebral microcirculation. In vitro techniques for studying isolated perfused microvessels are used to examine questions centered on endothelial smooth muscle cell integration of

cerebral blood flow responses.

Jeffrey M. Gidday, M.D., 286-2795. Research in our laboratory is aimed at understanding the mechanisms responsible for vascular dysfunction in brain, retina, and spinal cord in the setting of ischemia, episodic hypoxia, trauma and diabetes. Our studies employ videomicroscopic methods in transgenic mice and other animals to directly visualize oxidative, inflammatory and proteolytic injury processes in the CNS microcirculation. Cerebral and retinal endothelial cell cultures are also used concomitantly as in vitro models of microvascular injury. Another interest in the laboratory is developing models for, and elucidating the mechanisms of, robust neuroprotection in CNS tissues by sublethal hypoxic or ischemic stress, a process called preconditioning.

Robert L. Grubb, Jr., M.D., 5th Floor McMillan, 362-3567. Research on cerebral circulation and metabolism, utilizing short-lived cyclotron produced isotopes of oxygen, carbon and nitrogen is performed in humans. Positron emission tomography is used to measure cerebral circulation and metabolism in patients with severe head injuries, intra-cerebral hemorrhages and atherosclerotic carotid artery occlusive disease. Opportunities exist for the application of computer systems to biological modeling and data processing.

T. S. Park, M.D., 1S46 St. Louis Children's Hospital, 454-2811. Chemical and molecular mechanisms of neutrophil-mediated microvascular injury following ischemia in the brain. Neutrophil-endothelial adherence and consequent endothelial cell injury are studied in hypoxia-reperfusion models of whole animals and cultured endothelial cells. The role of nitric oxide, peroxynitrite, elastase and myeloperoxidase products on neutrophil and endothelial cells in neutrophil-endothelial interactions is under investigation. Clinical outcome of selective dorsal rhizotomies for treatment of spastic cerebral palsy, and selective amygdalohippocampectomy for treatment of intractable mesial temporal lobe epilepsy in childhood.

Keith M. Rich, M.D., 5th Floor McMillan, 362-3566. Research on neuronal and glioma cellular apoptosis after treatment with DNA-damaging agents. Techniques include growing human brain tumor cells in culture, bioassay for apoptosis with fluorescent staining, protein immunoblotting and PCR.

Thomas A. Woolsey, M.D., 3807 North Building, 362-3600. Dr. Woolsey studies structure, function, development, plasticity and blood flow in the central nervous system. The somatosensory system of rodents is the model system where each whisker has discrete and easily recognizable groups of neurons and projections at each central stations from the brainstem to the cerebral cortex. Currently under study are: (1) mechanisms of dynamic changes in the cerebral microcirculation with neuronal activity; (2) pattern formation in central neural pathways including the roles of functional activity growth factor; (3) brain function changes in models of stroke, tumors, and seizures; (4) interactions of groups of neurons for processing of sensory information.

Neill Wright, M.D., 5 McMillan, 362-3630, wrightk@nsurg.wustl.edu. Molecular aspects of spine fusion. Research in our laboratory is focused on the molecular aspects of spinal fusion. Our current focus is on the interactions between bone morphogenetic proteins (BMPs), proteins involved in many biological processes but also heavily implicated in the initiation of bone healing, and their receptors. Research tools used in our laboratory include in vitro manipulation of protein-receptor interactions, as well as animal studies.

## Faculty

**RALPH G DACEY, JR, MD** Henry G and Edith R Schwartz Professor of Neurological Surgery, Head of The Department of Neurological Surgery

**VENKATESH AIYAGARI, MD** Assistant Professor of Neurological Surgery

**ANDREAS H BURKHALTER, PHD** Associate Professor of Neurobiology in Neurological Surgery

**MICHAEL R CHICOINE, MD** Assistant Professor of Neurological Surgery

**MARGARET HELEN CLARE** Professor Emerita of Neurological Surgery

**DAVID R. COLLINS** Research Instructor in Neurological Surgery

**WILLIAM S COXE, MD** Professor Emeritus of Neurological Surgery

**DEWITTE T CROSS, III, MD** Associate Professor of Neurological Surgery

**COLIN PIETER DERDEYN, MD** Associate Professor of Neurological Surgery  
**HANS H DIETRICH, PHD** Research Assistant Professor of Neurological Surgery  
**MICHAEL N DIRINGER, MD** Professor of Neurological Surgery  
**JOSHUA L DOWLING, MD** Assistant Professor of Neurological Surgery  
**ROBERT E DRZYMALA, PHD** Associate Professor of Neurological Surgery  
**JACK R. ENGSBERG, PHD** Research Associate Professor of Neurological Surgery (Pending Executive Faculty Approval)  
**MOKHTAR H GADO, MBBCH** Professor of Neurological Surgery  
**JEFFREY M GIDDAY, PHD** Associate Professor of Neurological Surgery  
**FRANK G GILLIAM, MD** Associate Professor of Neurological Surgery  
**SIDNEY GOLDRING, MD, BA** Professor Emeritus of Neurological Surgery  
**ROBERT L GRUBB, JR, MD** Herbert Lourie Professor of Neurological Surgery  
**GARY WILLIAM HARDING** Research Scientist of Neurological Surgery  
**MATTHEW A HOWARD** Adjunct Assistant Professor of Neurological Surgery  
**JEFFREY R. LEONARD, MD** Assistant Professor of Neurological Surgery  
**JOHN WOOD MCDONALD, III, MD, PHD** Associate Professor of Neurological Surgery  
**BRADLEY MILLER, PHD** Research Assistant Professor of Neurological Surgery  
**CHRISTOPHER J MORAN, MD** Professor of Neurological Surgery  
**TAE SUNG PARK, MD** Shi Hui Huang Professor of Neurological Surgery  
**STEVEN E PETERSEN, PHD** Associate Professor of Neurological Surgery (Neuropsychology)  
**WILLIAM JOHN POWERS, MD** Professor of Neurological Surgery  
**KEITH M RICH, MD** Associate Professor of Neurological Surgery  
**PAUL SANTIAGO** Assistant Professor of Neurological Surgery  
**GORDON L SHULMAN, PHD** Research Scientist of Neurological Surgery (Neuropsychology)  
**LLOYD NORMAN SIMPSON** Research Assistant Professor Emeritus of Neurological Surgery  
**MATTHEW D SMYTH** Assistant Professor of Neurological Surgery  
**JOHN W STANDEVEN** Research Instructor in Neurological Surgery  
**TODD J. STEWART** Assistant Professor of Neurological Surgery  
**MICHAEL TALCOTT, DVM** Instructor in Neurological Surgery  
**RENE TEMPELHOFF, MD** Professor of Neurological Surgery  
**RICHARD D WETZEL, PHD** Professor of Neurological Surgery  
**THOMAS A WOOLSEY, MD** George H and Ethel R Bishop Scholar in Neuroscience in Neurological Surgery, Professor of Experimental Neurological Surgery  
**NEILL MARSHALL WRIGHT, MD** Assistant Professor of Neurological Surgery  
**LIYA YUAN, PHD** Research Instructor in Neurological Surgery  
**GREGORY JOSEPH ZIPFEL** Assistant Professor of Neurological Surgery (Pending Executive Faculty Approval)

## Department's Website

<http://neurosurgery.wustl.edu/>

## Department of Neurology

Neurology concerns itself with the diseases of brain, spinal cord, peripheral nerves and muscles. An introduction to the anatomy and physiology of the nervous system is presented in the first-year course in neural sciences directed by the Department of Anatomy and Neurobiology, with participation of faculty from Neurology. In the second year, the Department of Neurology presents the course in Diseases of the Nervous System in conjunction with the Departments of Pathology, Molecular Biology



and Pharmacology, Medicine, Neurosurgery and Pediatrics.

The course emphasizes how knowledge derived from basic or clinical investigations leads to improvements in clinical care. The departments also participate in the Clinical Medicine course, providing lectures, demonstrations and teaching exercises with patients in neurological physical diagnosis. In the third year, a four-week clerkship in Neurology introduces students to the clinical care of patients with diseases of the nervous system. Questions pertaining to neurosurgical treatment, neurorehabilitation and ethical issues in management also are addressed. In the fourth year, opportunities exist for many varieties of advanced clinical or research experience. A four-year residency program prepares medical graduates for specialization in neurology. Subspecialty fellowship programs routinely provide additional training in epilepsy; electrophysiology; EMG; sleep medicine; cerebrovascular disease and stroke; neuroimmunology; neurological critical care; neuromuscular disease; neuropsychology; and movement disorders.

Several divisions exist within Neurology:

Division of Neuropsychology: Steven E. Petersen, Ph.D. (Division Chief), Maurizio Corbetta, M.D., Francis Miezin, M.S., Gordon L. Shulman, Ph.D.

Division of Pediatric Neurology and Development: Steven M. Rothman, M.D. (Division Chief), Susan T. Arnold, M.D., Janice E. Brunstrom, M.D., Anne M. Connolly, M.D., Philip R. Dodge, M.D., W. Edwin Dodson, M.D., Jeffrey J. Neil, M.D., Ph.D., Michael J. Noetzel, M.D., Jean H. Thurston, M.D., Edwin Trevathan III, M.D., Kelvin A. Yamada, M.D.

In addition, several groups of faculty members are established for specialized research and teaching purposes. They include:

Aging and Dementia Section: Virginia D. Buckles, Ph.D. (Executive Director), Eugene M. Johnson Jr., Ph.D., John C. Morris, M.D. (Director), M. Carolyn Baum, Ph.D., David Carr, M.D., Mary A. Coats, B.S.N., Alexander W. Dromerick, M.D., Laura L. Dugan, M.D., Dorothy F. Edwards, Ph.D., James E. Galvin, M.D., David M. Holtzman, M.D. (Department Chairman), Terri L. Hosto, M.S.W., David Johnson, Ph.D., Thomas M. Meuser, Ph.D., B. Joy Snider, M.D., Ph.D., Martha Storandt, Ph.D.

Center for the Study of Nervous System Injury: Mark P. Goldberg, M.D. (Director), C. Robert Almlie, Ph.D., Philip V. Bayly, Ph.D., Janice E. Brunstrom, M.D., D. Anne Cross, M.D., Ralph G. Dacey Jr., M.D., Gabriel A. de Erausquin, M.D., Ph.D., Michael N. Diringer, M.D., Laura L. Dugan, M.D., Anne Fagan-Niven, Ph.D., James E. Galvin, M.D., MSc., Jeffrey M. Gidday, Ph.D., Mark P. Goldberg, M.D., David I. Gottlieb, Ph.D., David H. Gutmann, M.D., Ph.D., David M. Holtzman, M.D. (Department Chairman), Michael Howard, Ph.D., Chung Y. Hsu, M.D., Ph.D., Krzysztof Hyrc, Ph.D., Mark F. Jacquin, Ph.D., Eugene M. Johnson Jr., Ph.D., Jeong Sook Kim-Han, Ph.D., Jin-Moo Lee, M.D., Ph.D., Qun Li, M.D., John W. McDonald, M.D., Ph.D., Jeffrey D. Milbrandt, M.D., Ph.D., Jeffrey J. Neil, M.D., Ph.D., Yannan Ouyang, Ph.D., Tae Sung Park, M.D., Alexander Parsadanian, Ph.D., Joel S. Perlmutter, M.D., William J. Powers, M.D., Steven M. Rothman, M.D., Anneliese M. Schaefer, Ph.D., Christian Sheline, Ph.D., B. Joy Snider, M.D., Ph.D., Liu-Lin Thio, M.D., Ph.D., Ling Wei, M.D., Michael Wong, M.D., Ph.D., Jian Xu, Ph.D., Kelvin A. Yamada, M.D., Xiao-Feng Yang, M.S., M.D., Kejie Yin, M.D., Ph.D.

Cerebrovascular Disease Section: William J. Powers, M.D. (Section Head), Mark P. Goldberg, M.D. (Co-Head), Janice E. Brunstrom, M.D., Maurizio Corbetta, M.D., Michael N. Diringer, M.D., Alexander W. Dromerick, M.D., Laura L. Dugan, M.D., Dorothy F. Edwards, Ph.D., Robert Fucetola, Ph.D., David M. Holtzman, M.D. (Department Chairman), Chung Y. Hsu, M.D., Ph.D., Jin-Moo Lee, M.D., Ph.D., Abdullah Nassief, M.D., Jeffrey J. Neil, M.D., Ph.D., Michael J. Noetzel, M.D., Marcus E. Raichle, M.D., Steven M. Rothman, M.D., Bradley L. Schlaggar, M.D., Ph.D., Kelvin A. Yamada, M.D., Allyson Zazulia, M.D.

Clinical Neurophysiology Section: Muhammad T. Al-Lozi, M.D., Frank G. Gilliam, M.D., Edwin Trevathan III, M.D. (Section Heads), Susan T. Arnold, M.D., Anne M. Connolly, M.D., Stephen P. Duntley, M.D., Glenn Lopate, M.D., Liu Lin Thio, M.D., Ph.D., Michael Wong, M.D., Kelvin A. Yamada, M.D.

Sleep Section: Stephen P. Duntley, M.D., A. James Fessler III, M.D.

Epilepsy Section: Frank G. Gilliam, M.D., Edwin Trevathan III, M.D. (Section Co-Heads), Susan T. Arnold, M.D., Stephen P. Duntley, M.D., A. James Fessler III, M.D., Liu Lin Thio, M.D., Ph.D., Michael Wong, M.D., Kelvin A. Yamada, M.D.

Neuroimaging Section: William J. Powers, M.D. (Section Head), Juanita Carl, M.A., Maurizio Corbetta, M.D., Francis Miezin, M.S., Joel S. Perlmutter, M.D., Steven E. Petersen, Ph.D., Gordon L. Shulman, Ph.D., Tom O. Videen, Ph.D., Allyson Zazulia, M.D.

Movement Disorders Section: Joel S. Perlmutter, M.D. (Director), Kevin J. Black, M.D., William M. Landau, M.D., Brad A. Racette, M.D., W. Thomas Thach Jr., M.D.

Neuroimmunology Section: D. Anne Cross, M.D.; Jeri A. Lyons, Ph.D., Becky J. Parks, M.D.

Neurological Critical Care Section: Michael N. Diringer, M.D. (Section Head/Director—NNICU), Venkatesh Aiyagari, M.B.B.S., D.M., Edgar Garcia-Morales, M.D.

Neuromuscular Diseases Section: Alan Pestronk, M.D. (Director), Muhammad T. Al-Lozi, M.D., Anne M. Connolly, M.D., Julaine M. Florence, P.T., Glenn Lopate, M.D.

## **Courses**

### ***First Year***

#### **Selectives**

M04 5017-01 Clinical Correlations in Neuroscience

Instructor: Allyson Zazulia, M.D., 362-7241

Clinical faculty for this selective are members of the Departments of Neurology, Pediatric Neurology, Neurosurgery, Neuro ICU, Radiology, Pathology and Psychiatry. Students will shadow physicians, attend rounds, and meet for seminars and demonstrations to discuss particular patient cases and research studies. Teaching Objective—to gain exposure to medical career options involving neuroscience.

### ***Second Year***

M35 632 Diseases of the Nervous System

Instructor: Allyson Zazulia, M.D., 362-7241

The goal of this course is to provide an introduction to diseases of the central and peripheral nervous systems, including their clinical manifestations, pathology, pathophysiology and pharmacotherapy. The course includes reading assignments, lectures, laboratories, conferences and clinical presentations.

### ***Third Year***

M35 720 Neurology Clerkship

Instructor: Robert Naismith, M.D., 362-3293

A full-time, four-week clerkship is provided on the inpatient neurology services at Barnes-Jewish Hospital south. Patients are assigned to students who evaluate and follow them with the resident staff and discuss them regularly in conferences with the senior neurological staff. Students also work in the neurology clinic under staff supervision and attend a series of lectures on neurosurgical problems. The goal of this rotation is to gain expertise in the evaluation and treatment of patients with neurologic diseases.

Up to two students may elect to obtain their clerkship experience on the neurosurgery service. Up to two students may elect a two-week experience in outpatient pediatric neurology. Students participate in the neurology specialty clinics at Children's Hospital, working under the supervision of pediatric neurology fellows and senior staff.

M25 730 Physical Medicine and Rehabilitation Clerkship

Instructor: Oksana Volshteyn, M.D., 454-7757

Clerkship in PM&R for third-year medical students provides an opportunity to gain basic knowledge and clinical skills in evaluation and management of wide range of neurological and musculoskeletal diseases and conditions that require specialized rehabilitative medical and therapeutic care. Students spend two weeks on Spinal Cord Injury Unit (SCI) and two weeks on Brain Injury (BI) and Stroke Unit

at The Rehabilitation Institute of St. Louis. Students are expected to be a part of the rehabilitation team, follow two to three patients, participate in daily morning rounds, participate in performing consults, attend team meetings and family conferences.

Students are required to attend several outpatient clinics such as SCI, BI, Amputee and Stroke. During the entire rotation, students work together with PM&R residents and fellows, and under direct guidance of the NeuroRehabilitation faculty. The usual duty hours are 7-7:30 a.m. to 5 p.m. on weekdays and 8 a.m. to noon on Saturdays. There is no night call.

Students are required to attend all PM&R curriculum lectures and conferences. On the first day of rotation, students meet with the PM&R program director to go over goals, objectives and schedules. Upon completion of the rotation, students are required to fill out the evaluation form to provide feedback regarding rotation experience.

## ***Fourth Year***

### **Electives**

#### **M35 815 CONSULT NEUROLOGY**

Instructor(s): Mark Goldberg, M.D., 362-3296

Location: Barnes-Jewish Hospital and Emergency Rooms

Elective Contact: Carol Lane, 362-3296

Other Information: Students should page neurology consult resident, 8:00 a.m. first day of elective. Obtain pager number in advance from Carol Lane, 362-3296.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The student will evaluate patients with neurological manifestations of medical, surgical and psychiatric diseases and participate in their care under the supervision of the consult resident and attending physician. The student also will attend weekly clinical conferences, including Neurology Grand Rounds. Student time distribution: Inpatient 90%, Outpatient 5%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Single attending and resident

Patients seen/weekly: 10-15

On call/weekend responsibility: No call/weekends until noon Saturday

#### **M35 851 CLINICAL ASPECTS OF AGING AND DEMENTIA**

Instructor(s): John C. Morris, M.D., and James E. Galvin, M.D., 286-2683

Location: Health Key Building

Elective Contact: Tom Meuser, Ph.D. or Mary Coats, M.S.N. 286-2683

Other Information: Contact Dr. Meuser prior to first day of elective to set up orientation. Students should report to the Memory and Aging Project in the Health Key Building at 4488 Forest Park Avenue, 8:30 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 9, 13, 33 and 37.

This elective focuses on the distinction of dementia from healthy aging and on the differential diagnosis of dementia, including Alzheimer's disease, dementia with Lewy bodies, frontotemporal dementias, cerebrovascular disorders, and affective disorders. The student will gain proficiency in interviewing techniques and in the neurologic examination of the geriatric patient, be introduced to neuropsychological, neuropathological, radiologic and other biomedical procedures important in the diagnostic evaluation of the aged, and consider clinical trials of experimental agents used in memory disorders and practical aspects of the management of the demented patient and his or her family.

Student time distribution: Outpatient 80%, Conferences/Lectures 20%; Subspecialty Care 100%

Major teaching responsibility: Single attending

Patients seen/weekly: 6-10

On call/weekend responsibility: None

#### **M35 860 PEDIATRIC NEUROLOGY**

Instructor(s): Steven Rothman, M.D., 454-6042

Location: 12E25 St. Louis Children's Hospital

Elective Contact: Brenda McCall, 454-6042

Other Information: Students report to Dr. Rothman at St. Louis Children's Hospital, 8:30 a.m. first day of elective.

Enrollment limit per period: 1(Inpatient); 1(Consultation Office Service)

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

We offer two senior electives: (1) On our Inpatient Elective the student participates as a full member of the neurology ward team and is directly responsible for a proportion of patients on the service under the direction of the senior pediatric neurology resident. The student may take night call every third or fourth night, during which time s/he is responsible for the medical care of the entire ward, as well as for emergency admissions under supervision of a pediatric resident. Formal teaching rounds with the attending pediatric neurologist are held three times a week, and informal teaching rounds are held daily with the senior residents. (2) On our Outpatient Elective the student will attend daily outpatient clinics, during which time s/he will be able to evaluate outpatient problems under faculty guidance. There are pediatric neurology clinics five days a week, in addition to teaching conferences. This elective allows students to see many new and return patients in a tutorial type of setting since patients are immediately reviewed with senior faculty.

Student time distribution: Inpatient rotation 80%, Outpatient rotation 80%, Conferences/Lectures 20%; Subspecialty Care 100%

Major teaching responsibility: Inpatient: Single attending and senior resident, Outpatient: Multiple attendings

Patients seen/weekly: Inpatient: 5-9, Outpatient: 20-25

On call/weekend responsibility: Inpatient: Every fourth night, Outpatient: None

#### M35 861 NEUROLOGY/NEUROSURGERY ICU

Instructor(s): Michael Diring, M.D., and Venkatesh Aiyagari, M.D., 362-2999

Location: 10400B Barnes-Jewish Hospital

Elective Contact: Liz Vansickle, 362-2999

Other Information: Students report to 10400 ICU, 8:30 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The student will be integrated into the Critical Care Team that provides care in the Neurology/Neurosurgery ICU. Diseases frequently encountered include intracerebral hemorrhage, head trauma, subarachnoid hemorrhage and stroke. The student will follow patients, participate in rounds and perform some procedures under supervision. Daily didactic sessions will be provided as conferences or lectures from the ICU attending.

Student time distribution: Inpatient 80%, Conferences/Lectures 20%; Subspecialty Care 100%

Major teaching responsibility: Fellows and residents

Patients seen/weekly: 25

On call/weekend responsibility: Variable

#### M35 870 EPILEPTOLOGY

Instructor(s): Frank Gilliam, M.D., 362-3888

Location: Epilepsy Monitoring Unit, Barnes-Jewish Hospital, South Campus 11400

Elective Contact: Jewell Carter, 362-7845

Other Information: Students meet at 9:00 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 29, 33, 37, and 41.

Students will be involved, mainly as observers, in diagnosing and managing both surgical and medical patients with epileptic disorders. The patients are in outpatient and inpatient settings. They are also required to do one patient write up each and one talk on a topic relevant to epilepsy.

Student time distribution: Inpatient 25%, Outpatient 50%, Conferences/ Lectures 25%; Subspecialty Care 100%

Major teaching responsibility: Attendings and fellows

Patients seen/weekly: 40

On call/weekend responsibility: None

## M80 807 PHYSICAL MEDICINE AND REHABILITATION

Instructor(s): Oksana Volshteyn, M.D., 454-7757, volshteyno@neuro.wustl.edu

Location: Suite E226, Neurology Department, Rehabilitation section, 4444 Forest Park

Elective Contact: Donna Barbier, 454-7757, barbierd@neuro.wustl.edu

Other Information: Students report to Suite E226, Neurology Department, Rehabilitation section, 4444 Forest Park, 8:00 a.m. first day of elective.

Rotation location -- The Rehabilitation Institute of St. Louis, 4455 Duncan Ave.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The elective is designed to provide the student with a broad introduction to the field of Physical Medicine and Rehabilitation. Major objective of this clinical elective is to achieve greater knowledge of the neurological and musculoskeletal diseases and their treatment, and gain understanding of basic principals of rehabilitation. The student will learn the clinical and rehabilitative care of patients with strokes, traumatic brain injury, spinal cord trauma and diseases and limb amputations. Student will gain clinical skills in evaluating in management of functional impairments. Students will be expected to participate in daily rounds on inpatient rehabilitation units with the clinical care team, follow 3-5 patients, attend multidisciplinary team conferences and family meetings, attend outpatient rehabilitation clinics in spinal cord, stroke, traumatic brain injury and amputee. Teaching and supervision is provided by the physiatry and neurology faculty of the Division of Rehabilitation. Rehabilitation and neurology residents are involved in student teaching as well. Students are required to participate in didactic teaching conferences within the PM&R residency.

This rotation is particularly useful for students considering careers in rehabilitation, neurology, geriatrics, primary care, neurosurgery or any other field that will require experience in the evaluation and management of patients with physical impairment and disabilities.

Student time distribution: Inpatient 70%, Outpatient 20%, Conferences/Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attending faculty and residents

Patients seen/weekly: 20

On call/weekend responsibility: None

## Research

### **(M35 900)**

David B. Clifford, M.D., 362-9731. Clinical treatment of neurologic manifestations of AIDS, including peripheral neuropathy, AIDS Dementia, and progressive multifocal leukoencephalopathy. Quantitative virologic correlations are a particular area of concentration with current studies.

Maurizio Corbetta, M.D., 2112 East Building, 747-0426. The elective will provide hands-on experience in using functional neuroimaging (PET and fMRI) to map regions of the human brain responsible for vision and attention, and to study recovery of function in patients with cognitive deficits (aphasia, neglect) and brain injury.

Anne H. Cross, M.D., 3rd Floor McMillan, 362-3293. Understanding interactions of the immune system with the central nervous system as it relates to multiple sclerosis and other neuroimmunological disorders. Our goal is to understand how immune cells cross the blood-brain barrier and initiate the cascade of events leading to lesions of multiple sclerosis.

Mark P. Goldberg, M.D., 201 Biotechnology Center (Center for the Study of Nervous System Injury), 362-3258. Web-based neurology education. The student will select a topic and target audience, then develop web-based materials to teach the topic. Target audiences may include medical students, patients or family members, or allied health professionals. Most topics will be related to stroke. Completed projects will appear on the Internet Stroke Center web site ([www.strokecenter.org](http://www.strokecenter.org)) or the education web site of the Department of Neurology. Web development skills are welcome but NOT required.

David H. Gutmann, M.D., Ph.D., 306 Biotechnology Center, 362-7149. Neuro-oncology Research. Our laboratory is interested in the molecular pathogenesis of human nervous system tumors. We are approaching this problem by determining the function of several relevant nervous system tumor suppressor genes in vitro as well as by developing animal models in which these genes and their downstream signaling partners have been genetically altered in vivo. In addition, we have several studies ongoing to identify novel genes associated with tumor formation and malignant progression. The studies ongoing in my laboratory are focused on understanding the basic molecular biological alterations critical for the development and progression of nervous system cancers in an effort to ultimately identify potential targets for future cancer therapies as well as to define genetic markers for improved tumor classification and prognostic stratification.

Individuals affected with the neurofibromatosis 1 (NF1) and tuberous sclerosis complex (TSC) cancer predisposition syndromes develop brain tumors (astrocytomas) at an increased frequency. Our laboratory is studying the function of the NF1 and TSC tumor suppressor gene products in the regulation of astrocyte proliferation both in vitro and in vivo. Mouse models for NF1 and TSC astrocytomas have been developed and are presently being characterized. In addition, our laboratory has been actively involved in the development and characterization of specific mouse models for sporadic human astrocytomas. We have generated several transgenic and conditional knockout mouse strains for studies aimed at better understanding the molecular pathogenesis of astrocytomas.

Individuals with the neurofibromatosis 2 (NF2) inherited cancer predisposition syndrome develop meningiomas at an increased frequency. The NF2 gene product, merlin, belongs to the Protein 4.1 family of molecules that link the actin cytoskeleton to cell surface glycoproteins. Studies in our laboratory have focused on the mechanism(s) by which merlin regulates cell proliferation and tumor growth. In addition, we have identified a second Protein 4.1 tumor suppressor that we have shown is also important in the pathogenesis of meningiomas. Studies on these novel Protein 4.1 tumor suppressors will likely expand our understanding about the signaling processes involved in contact inhibition growth arrest.

John W. McDonald, M.D., Ph.D., 4444 Forest Park, Suite E226, 454-8663. Spinal cord injury regeneration. Mechanisms of spinal cord injury and regeneration with emphasis on embryonic stem cell transplantation and remyelination.

Steven E. Petersen, Ph.D., 2108 East Building, 362-3319. This lab is interested in the functional localization of higher brain processes, particularly those processes related to language, memory and visual attention. Our main approach to these issues is the use of PET and fMRI activation, but we also study task performance in normal and selected patient populations.

Marcus E. Raichle, M.D., Neuro Imaging Laboratory, 2nd Floor East Building, 362-6907. In vivo brain hemodynamic, metabolic and functional studies of human cognition and emotion using cyclotron-produced isotopes and emission tomography (PET) as well as functional magnetic resonance imaging (fMRI) in humans. See also Steven E. Petersen, Ph.D.

Kel Yamada, M.D., 204 Biotechnology Center, 362-3533, 454-6120. Research on mechanisms modulating synaptic transmission in the central nervous system using electrophysiological techniques in neuronal cell cultures, in brain slices, and in live rodents. Studies are relevant to epilepsy, neonatal brain injury, and stroke.

## Faculty

**DAVID MICHAEL HOLTZMAN, MD** Head of the Department of Neurology, Paul Hagemann Professor of Neurology

**ANINDA BHAT ACHARYA, MD** Instructor in Clinical Neurology

**VENKATESH AIYAGARI, MD** Assistant Professor of Neurology

**MUHAMMAD TAHER AL-LOZI, MD** Associate Professor of Neurology

**C. ROBERT ALMLI, PHD** Associate Professor of Neurology

**DENIS IAN ALTMAN, MBBCH** Associate Professor of Clinical Neurology

**LIZETTE ALVAREZ-MONTERO, MD** Instructor in Clinical Neurology

**SUSAN T ARNOLD, MD** Associate Professor of Neurology

**SYLVIA AWADALLA, MD** Associate Professor of Clinical Neurology  
**DAVID ANTHONY BALOTA, PHD** Professor of Neurology  
**JANET MARIE BALOTA, PHD** Assistant Professor of Neurology  
**M. CAROLYN BAUM, PHD** Professor of Neurology (Occupational Therapy)  
**MAX PRELY BENZAQUEN** Instructor in Clinical Neurology  
**LEONARD BERG, MD** Professor Emeritus of Neurology  
**ANGELA LAMBERT BERRY** Research Instructor in Neurology  
**JOSEPH T BLACK, MD** Professor of Clinical Neurology  
**KEVIN J BLACK, MD** Associate Professor of Neurology  
**LYNN BENNETT BLACKBURN, PHD** Assistant Professor of Clinical Neurology  
**JAMES SCOTT BONNER, MD** Instructor in Clinical Neurology  
**JACK BOTWINICK, PHD** Professor Emeritus of Neurology (Psychology)  
**ROBERT P. BRENDZA, PHD** Research Instructor in Neurology  
**DAVID L BRODY, MD, PHD** Instructor in Neurology  
**KELLY M BROWN, MD** Assistant Professor of Neurology (Pending Executive Faculty Approval)  
**JANICE E BRUNSTROM, MD** Assistant Professor of Neurology  
**VIRGINIA D BUCKLES, PHD, MS, BS** Research Associate Professor of Neurology  
**JOHN J BURNS, PHD** Adjunct Professor of Neurology  
**GARRETT C BURRIS, MD** Associate Professor of Clinical Neurology  
**DAVID J CALLAHAN, MD** Assistant Professor of Clinical Neurology  
**RUSSELL C. CANTRELL, MD** Instructor in Clinical Neurology  
**JUANITA L CARL** Research Instructor in Neurology  
**DAVID B CARR, MD** Associate Professor of Neurology  
**MARGARET HELEN CLARE** Professor Emerita of Neurology  
**DAVID B CLIFFORD, MD** Melba and Forest Seay Professor of Clinical Neuropharmacology in Neurology  
**MARY A COATS** Research Instructor in Neurology  
**LAWRENCE A COBEN, MD** Associate Professor Emeritus of Neurology  
**ANNE MAUREEN CONNOLLY, MD** Associate Professor of Neurology  
**MAURIZIO CORBETTA, MD** Associate Professor of Neurology  
**DOROTHY ANNE CROSS, MD** Professor of Neurology  
**DIANE L. DAMIANO, PHD** Research Associate Professor of Neurology  
**GABRIEL A DE ERAUSQUIN, MD, PHD** Assistant Professor of Neurology  
**COLIN PIETER DERDEYN, MD** Associate Professor of Neurology  
**SUSAN DEUSINGER, PHD** Professor of Neurology  
**MICHAEL N DIRINGER, MD** Professor of Neurology  
**PHILIP ROGERS DODGE, MD** Professor Emeritus of Neurology  
**WILLIAM EDWIN DODSON, MD** Professor of Neurology  
**JOSEPH M DOOLEY, JR, MD** Associate Professor of Clinical Neurology  
**ALEXANDER W DROMERICK, MD** Associate Professor of Neurology  
**LAURA DUGAN, MD** Associate Professor of Neurology  
**STEPHEN P DUNTLEY, MD** Associate Professor of Neurology  
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**SVEN GUSTAV ELIASSON, MD, PHD** Professor Emeritus of Neurology

**JUAN ESCANDON, MD** Assistant Professor of Clinical Neurology  
**KEVIN C ESS, MD, PHD** Instructor in Neurology  
**JULAINIE MARIE FLORENCE** Research Associate Professor of Neurology  
**BENNETT DAVID FRANK, MD, PHD** Instructor in Clinical Neurology  
**ROBERT FUCETOLA, PHD** Assistant Professor of Neurology  
**JAMES E. GALVIN, MD** Assistant Professor of Neurology  
**FRANK G GILLIAM, MD** Associate Professor of Neurology  
**ALISON GOATE, PHD** Professor of Neurology  
**MARK PAUL GOLDBERG, MD** Professor of Neurology  
**JAMES M GOLDRING, MD, PHD** Instructor in Clinical Neurology  
**JENNIFER D GOLDSTEIN, PHD** Assistant Professor of Neurology  
**PAUL T GOLUMBEK, MD, PHD** Instructor in Neurology  
**DAVID B GRAY, PHD** Associate Professor of Neurology  
**ROYAL GENE GRUENEICH, PHD** Assistant Professor of Clinical Neurology  
**CHRISTINA A. GURNETT, MD, PHD** Instructor in Neurology  
**DAVID H GUTMANN, MD, PHD** Donald O. Schnuck Family Professor of Neurology  
**JOSEPH HANAWAY, MD** Assistant Professor of Clinical Neurology  
**WILLIAM B HARDIN, JR, MD, BA** Assistant Professor Emeritus of Clinical Neurology  
**J MICHAEL HATLELID, MD** Associate Professor of Clinical Neurology  
**TAMARA G HERSHEY, PHD** Instructor in Neurology  
**TERRI L HOSTO** Research Instructor in Neurology  
**MICHAEL J. HOWARD, PHD** Research Instructor in Neurology  
**CHUNG HSU, MD, PHD** Adjunct Professor of Neurology  
**THY N HUSKEY, MD** Assistant Professor of Neurology (Pending Executive Faculty Approval)  
**KRZYSZTOF HYRC, PHD** Research Instructor in Neurology  
**TERRIE E INDER** Adjunct Associate Professor of Neurology  
**JOE INUKAI** Research Assistant Professor Emeritus of Neurology  
**MARK F JACQUIN, PHD** Research Professor of Neurology  
**DAVID K JOHNSON, PHD** Research Instructor in Neurology  
**EUGENE MALCOLM JOHNSON, JR, PHD** Stupp Professor of Neurology  
**NERINGA JUKNIS, MD** Instructor in Neurology  
**RICHARD T. KATZ, MD** Associate Professor of Clinical Neurology  
**SYED AHMED KHADER, MD** Instructor in Clinical Neurology  
**JEONG SOOK KIM-HAN, PHD** Research Assistant Professor of Neurology  
**ASHOK KUMAR, MD** Assistant Professor of Clinical Neurology  
**WILLIAM M LANDAU, MD** Professor of Neurology  
**JIN-MOO LEE, MD, PHD** Assistant Professor of Neurology  
**WALTER LEMANN, III, MD** Associate Professor of Clinical Neurology  
**QUN LI, MD, PHD** Research Instructor in Neurology  
**TIEN-SUNG TOM LIN, PHD** Professor of Neurology  
**GLENN LOPATE, MD** Associate Professor of Neurology  
**WARREN E LUX, MD** Adjunct Associate Professor of Neurology  
**TIMOTHY M LYNCH, MD** Assistant Professor of Neurology (Pending Executive Faculty Approval)  
**JOHN F MANTOVANI, MD** Associate Professor of Clinical Neurology



**ROBERT P MARGOLIS, MD** Assistant Professor of Clinical Neurology  
**LEONARD N MATHESON, PHD, MA** Associate Professor of Neurology  
**JOHN WOOD MCDONALD, III, MD, PHD** Associate Professor of Neurology  
**LORI MCGEE-MINNICH** Research Instructor in Neurology  
**DAVID F MENDELSON, MD** Assistant Professor Emeritus of Clinical Neurology  
**THOMAS M MEUSER, PHD** Research Assistant Professor of Neurology  
**FRANCIS M MIEZIN** Research Scientist of Neurology  
**BRADLEY MILLER, PHD** Research Assistant Professor of Neurology  
**PAMELA F MILLSAP** Research Instructor in Neurology  
**JOHN CARL MORRIS, MD** Harvey A and Dorismae Hacker Friedman Professor of Neurology  
**ROBERT T NAISMITH, MD, MD** Assistant Professor of Neurology (Pending Executive Faculty Approval)  
**HYUNWOO NAM** Visiting Assistant Professor of Neurology  
**ABDULLAH M NASSIEF, MD** Assistant Professor of Neurology  
**JEFFREY J NEIL, MD, PHD** Professor of Neurology  
**ANNE FAGAN NIVEN, PHD** Research Associate Professor of Neurology  
**MICHAEL JUSTIN NOETZEL, MD** Professor of Neurology  
**BARBARA JEAN NORTON, PHD** Associate Professor of Neurology  
**YANNAN OUYANG, PHD** Research Assistant Professor of Neurology  
**JANICE LYNN PALMER** Research Instructor in Neurology  
**BECKY J PARKS, MD** Assistant Professor of Neurology  
**ALEXANDER PARSADANIAN, PHD** Research Assistant Professor of Neurology  
**ALAN L PEARLMAN, MD** Professor Emeritus of Neurology  
**DAVID M PEEPLES, MD** Instructor in Clinical Neurology  
**KAREN J PENTELLA, MD** Assistant Professor of Neurology  
**JOEL S PERLMUTTER, MD** Professor of Neurology  
**ALAN PESTRONK, MD** Professor of Neurology  
**STEVEN E PETERSEN, PHD** James S. McDonnell Professor of Cognitive Neuroscience in Neurology  
**DANIEL PHILLIPS, MD, BS EE** Assistant Professor of Clinical Neurology  
**SHULAMIT PORTNOY, MD** Instructor in Clinical Neurology  
**WILLIAM JOHN POWERS, MD** Professor of Neurology  
**ARTHUR L PRENSKY, MD** Professor Emeritus of Neurology  
**BRAD ALAN RACETTE, MD** Associate Professor of Neurology  
**MARCUS E RAICHLE, MD** Professor of Neurology  
**DAVID MARTIN REISLER, MD** Assistant Professor of Clinical Neurology  
**JAMES R ROHRBAUGH, MD** Associate Professor of Clinical Neurology  
**HERBERT E ROSENBAUM, MD** Professor of Neurology  
**STEVEN MARK ROTHMAN, MD** Stein Professor of Neurology  
**RIMMA RUVINSKAYA, MD** Assistant Professor of Neurology  
**CRISTINA SADOWSKY, MD** Assistant Professor of Neurology  
**SHIRLEY ANN SAHRMANN, PHD** Professor of Neurology (Neurophysiology)  
**BRADLEY L SCHLAGGAR, MD, PHD** Assistant Professor of Neurology  
**EARL R SCHULTZ, MD, BS** Professor of Clinical Neurology  
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**YVETTE I SHELINE, MD** Associate Professor of Neurology

**GORDON L SHULMAN, PHD** Research Scientist of Neurology

**ELI R SHUTER, MD** Associate Professor of Clinical Neurology

**TODD B SILVERMAN** Instructor in Clinical Neurology

**LLOYD NORMAN SIMPSON** Research Assistant Professor Emeritus of Neurology

**BARRY A. SINGER** Assistant Professor of Clinical Neurology

**BARBARA JOY SNIDER, MD, PHD** Assistant Professor of Neurology

**ABRAHAM Z SNYDER, MD, PHD** Research Scientist of Neurology

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**STACY LYNN STIENING** Research Instructor in Neurology

**JENNIFER S STITH, PHD** Assistant Professor of Neurology

**MARTHA STORANDT, PHD** Professor of Neurology (Psychology)

**IN SOOK SUNWOO, MD** Instructor Emerita in Neurology

**SAMER D TABBAL, MD** Assistant Professor of Neurology

**SANDRA L TATE, MD** Instructor in Clinical Neurology

**W. THOMAS THACH, MD** Professor of Neurology

**KWEE L THIO, MD, PHD** Assistant Professor of Neurology

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**CHRISTY MARIE TOMLINSON** Research Instructor in Neurology

**NORMAN EDWIN TREVATHAN, III, MD** Professor of Neurology

**EDWARD F VASTOLA, MD** Professor Emeritus of Neurology

**TOM O VIDEEN, PHD** Research Associate Professor of Neurology

**OKSANA VOLSHTEYN, MD** Associate Professor of Neurology

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**RICHARD D WETZEL, PHD** Professor of Neurology

**MICHAEL WONG, MD, PHD** Assistant Professor of Neurology

**THOMAS A WOOLSEY, MD** George H and Ethel R Bishop Scholar in Neuroscience in Neurology, Professor of Experimental Neurology

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**JOHN M ZEMPEL, MD, PHD** Instructor in Neurology

## Department's Website

<http://www.neuro.wustl.edu/>

## Department of Obstetrics and Gynecology

The Department of Obstetrics and Gynecology has clinical teaching services located at Barnes-Jewish Hospital and Missouri Baptist Hospital under the following director:

James R. Schreiber, M.D.,  
Professor and Head, Department of Obstetrics and Gynecology

In addition, for the purposes of teaching, clinical care and research, the Department of Obstetrics and Gynecology is divided into subspecialty divisions under the following directors:

Gynecologic Oncology: David G. Mutch, M.D.

Maternal-Fetal Medicine: Yoel Sadovsky, M.D.

Reproductive Endocrinology and Infertility: Randall R. Odem, M.D.

Gynecology: Rebecca P. McAlister, M.D.

Research: D. Michael Nelson, M.D., Ph.D.

Instruction in Obstetrics and Gynecology is provided during all four years of the medical curriculum, beginning with an introductory course in the first year as a component of Clinical Medicine. Teaching in the second year is designed to correlate basic science with the physiologic basis of normal pregnancy and parturition, reproductive biology and gynecologic malignancies. All third-year medical students participate in a 12-week clinical clerkship in Women's and Children's Health. This is divided into three four-week components of pediatrics, maternal-infant health and gynecology. In the fourth year, students may elect a subinternship in the listed clinical subspecialties or a research elective.

## **Courses**

### ***First Year***

As a component of the course in Clinical Medicine offered by the Department of Medicine, the student is introduced to the essentials in the medical history and examination for the gynecological evaluation of the adult woman patient.

### ***Second Year***

Second-year students are introduced to obstetrics and gynecology with lectures in reproductive biology that apply and expand upon pelvic anatomy and gynecologic and obstetric physiologic principles taught in the first year.

#### **M45 635B OBSTETRICS AND GYNECOLOGY**

Instructor: Andrea L.P. Stephens, M.D., 362-3126

The obstetrical component of this course emphasizes the physiologic basis of normal pregnancy, parturition, and labor and delivery, and adaptations of other organ systems to pregnancy.

Pathophysiology of pregnancy and deviations from normal labor will also be introduced. The gynecologic component of the course reviews embryology and includes the topics pediatric and adolescent gynecology,

amenorrhea, abnormal uterine bleeding, menopause, surgical anatomy, and diagnosis and treatment of gynecologic neoplasms.

### ***Third Year***

#### **M45 730 OB/GYN CLERKSHIP**

Instructor: Andrea L.P. Stephens, M.D., 362-3126

Comprehensive study of the reproductive health needs of women is the focus of the curriculum.

Opportunity for supervised active participation is emphasized in outpatient clinics, routine and high-risk obstetrics, care of the infertile and oncology patient, including surgical case management.

Students are assigned as clinical clerks to rotations at Barnes-Jewish Hospital and Missouri Baptist Hospital. Faculty, house staff and nurse practitioners provide teaching for this rotation. Students participate in all teaching conferences offered by the department; core curriculum topics are presented in a seminar series and in small group sessions with faculty preceptors.

### ***Fourth Year***

Fourth-year students wishing to take an externship or research elective can choose from a variety of courses.

## **Electives**

#### M45 804 OB/GYN OUTPATIENT CARE SUBINTERNSHIP

Instructor(s): Andrea L. P. Stephens, M.D., 362-4211

Location: Room 210, Maternity Hospital, Barnes-Jewish Hospital, South Campus

Elective Contact: Patti Hill, 362-1016

Other Information: Students should call Dr. Stephens' office at 362-4211, 9 a.m. first day of elective for instructions.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This experience is designed to acquaint the student with the diagnosis and care of outpatients. While primarily located in the Gynecology Clinic and Outpatient Surgery unit, it should provide a more general overview of how to evaluate, diagnose and provide definitive treatment (both medical and surgical) without hospital admission. The subintern will spend three to four half days weekly participating in outpatient surgery under the supervision of attendings and house staff, and five to six additional half days in clinic and private offices. Students will receive a better understanding of mechanisms utilized in providing surgical care to outpatients and an introduction to both the style and substance of office care.

Student time distribution: Outpatient 100%; Primary Care 100%

Major teaching responsibility: Attendings

Patients seen/weekly: 5-10/day

On call/weekend responsibility: None

#### M45 810 OB-GYN ENDOCRINOLOGY-INFERTILITY SUBINTERNSHIP

Instructor(s): Randall Odem, M.D., 286-2421

Location: 4444 Forest Park Avenue, Suite 3100

Elective Contact: Randall Odem, M.D., 286-2421

Other Information: Students report to Dr. Odem first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The subintern will participate (in the office and hospital) in the study and treatment of women with reproductive endocrine disorders and infertility. S/he will attend and present in conferences, attend surgery, observe assisted reproductive technology procedures, have assigned reading and be an integral part of the reproductive endocrine service. Opportunities for clinical research projects in reproductive endocrinology are also available.

Student time distribution: Inpatient 10%, Outpatient 75%, Conferences/ Lectures 15%; Primary Care 10%, Subspecialty Care 90%

Major teaching responsibility: Attendings, fellow, and residents

Patients seen/weekly: 100

On call/weekend responsibility: None

#### M45 825 GYNECOLOGY ACROSS A WOMAN'S LIFE-SPAN

Instructor(s): Diane Merritt, M.D., 362-1016

Location: Room 208 Maternity Hospital, Barnes-Jewish Hospital, South Campus

Elective Contact: Patti Hill, 362-1016 or e-mail [merrittd@msnotes.wustl.edu](mailto:merrittd@msnotes.wustl.edu)

Other Information: Students should call Dr. Merritt's office the Friday before elective starts. Suggested reading may be picked up the week prior to the start of the rotation. Contact Dr. Merritt by e-mail.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 13, 17, 21, 25, 29, 33, 37, and 41. (Individual students must contact Dr. Merritt regarding her summer schedule if Weeks 1-12 are desired.)

This clinical experience is designed to acquaint the student with outpatient gynecology as it impacts the patient at various times in her lifespan (infancy, adolescence, reproductive years, peri- and post-menopause). Sexuality and sexual dysfunction, congenital anomalies of the reproductive tract, contraception, hormone replacement therapy, pediatric and adolescent gynecology, and outpatient management are the focus of this elective. (Obstetrics is not.) The student will spend five half-days a week in clinic seeing patients with Dr. Merritt. The student will also attend departmental conferences and be responsible for independent reading assignments in outpatient gynecology.

Student time distribution: Outpatient 100%; Subspecialty Care-Gyn 100%

Major teaching responsibility: Attending and independent reading  
Patients seen/weekly: 5-20/day  
On call/weekend responsibility: None

#### M45 830 GYN ONCOLOGY SUBINTERNSHIP

Instructor(s): David Mutch, M.D., 362-3181  
Location: Maternity Hospital, Barnes- Jewish Hospital, South Campus  
Elective Contact: David Mutch, M.D., 362-3181  
Other Information: Students report to Dr. Mutch, 3rd Floor Maternity Hospital,  
9 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The subintern will take part in the work-up of tumor patients prior to surgery and/or radiotherapy, assist in pelvic operations, help render postoperative care and review pathology specimens and slides. S/he will participate in GYN Tumor Clinic sessions, make hospital rounds with house staff, consultations and attend OB-GYN conferences. Opportunities for clinical or basic research project in gynecologic malignancy are also available.

Student time distribution: Inpatient 70%, Outpatient 20%, Conferences/ Lectures 10%; Primary Care 20%, Subspecialty Care 80%

Major teaching responsibility: Attendings, fellows, and residents

Patients seen/weekly: 40

On call/weekend responsibility: Weekend rounds

#### M45 840 MATERNAL-FETAL MEDICINE SUBINTERNSHIP

Instructor(s): Gil Gross, M.D., 747-1336  
Location: Maternity Hospital, Barnes- Jewish Hospital, South Campus  
Elective Contact: Gil Gross, M.D., 747-1336  
Other Information: Students report to Antepartum Service (ward 5300), 7:30 a.m. first Monday of elective. If the first day is a holiday, call ahead to Dr. Gross for instructions.

Enrollment limit per period: 1, unless cleared by course master.

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Sub-interns will participate in the antepartum management of high-risk hospitalized patients as well as complicated outpatients through the High-Risk Obstetrics Clinics and the Center for Diabetes in Pregnancy. Examples include diabetes, hypertension, renal disease, hematologic abnormalities, preterm labor and others. Antepartum evaluation and monitoring of the pregnant woman and her fetus are emphasized. Supervision is by the antepartum chief resident and a maternal-fetal medicine faculty member. An opportunity for intense labor and delivery experience with the Night Team is also encouraged. Students will spend time observing both genetic counseling and diagnostic obstetric ultrasound examinations. The student will prepare a brief talk on a topic of his/her interest during the course of the rotation.

Student time distribution: Inpatient 60%, Outpatient 35%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Attendings and residents

Patients seen/weekly: Inpatient: 20; Outpatient: 20

On call/weekend responsibility: Overnight/weekend call optional—student self-scheduled

#### M45 856 OB/GYN ULTRASOUND - GENETICS

Instructor(s): Jeffrey Dicke, M.D., 454-8135  
Location: Ultrasound Unit, 1st Floor Barnes-Jewish Hospital, North Campus  
Elective Contact: Jeffrey Dicke, M.D.,  
454-8135  
Other Information: Students should contact Dr. Dicke prior to first day of elective.

Enrollment limit per period: 1

Valid start weeks for 2-week blocks are: Weeks 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41 and 43.

The student will learn the principles and techniques of non-invasive screening for fetal disorders,

observe the performance of invasive prenatal diagnostic procedures and learn the standards and guidelines for performance of the antepartum obstetrical ultrasound examination and female pelvic examination. The student will also gain experience in pedigree analysis and familial risk factor assessment working with genetic counselors. Opportunities for participation in clinical research are also available.

Student time distribution: Outpatient 90%, Conferences/Lectures 10%; Primary Care 30%, Subspecialty Care 70%

Major teaching responsibility: The four attendings of the ultrasound section

Patients seen/weekly: 40

On call/weekend responsibility: None

#### **M65 833 SPECIAL TOPICS IN REPRODUCTIVE HEALTH**

Instructor(s): F. Sessions Cole, M.D., 454-6148

Location: 5S20 St. Louis Children's Hospital

Elective Contact: F. Sessions Cole, M.D., 454-6148

Other Information: Students meet at 5S20 St. Louis Children's Hospital, 8:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students will participate in clinical experiences in four clinical modules: contraception, sexually transmitted diseases, abortion and special topics (HIV infection and adolescence). Required reading will include relevant review articles. Clinical experiences will be primarily ambulatory.

Student time distribution: Outpatient 90%, Conferences/Lectures 10%; Primary Care 30%,

Subspecialty Care 70%

Major teaching responsibility: Attendings

Patients seen/weekly: 10

On call/weekend responsibility: None

## **Research**

### **(M45 900)**

Irving Boime, Ph.D., 319-320 McDonnell Science Building, 362-2556. Our laboratory is concerned with the biosynthesis of the gonadotropin hormones in the placenta and pituitary. Specifically, these interests can be divided into two general categories: 1) Structure-function studies that deal with the determinants for secretion, sorting and biological activity of these hormones. Such work includes the design of analogs for potential clinical use. 2) Factors governing expression of several placental and pituitary hormone genes. The approaches to these problems involve the use of site-directed mutagenesis and transgenic animals.

Kelle H. Moley, M.D., Room 616, Maternity Hospital, 362-1765. Preimplantation Embryogenesis and Glucose Transporter Biology. From animal and human studies it is clear that mammalian embryos are vulnerable to injury during the preimplantation stage of development. Glucose transport and metabolism are critical for blastocyst formation and further development. The primary focus of our laboratory is how early preimplantation glucose transport and metabolism affects the outcome of pregnancy at a molecular level. An elective in our lab would allow exposure to bench work in reproductive biology.

Glucose enters the blastocyst via one of four facilitative glucose transporters, GLUT1-3, and the novel insulin-regulated transporter we recently cloned, GLUT8. We have shown that murine maternal hyperglycemia leads to down regulation of GLUT1-3 at the blastocyst stage and that this event triggers apoptosis via pathways involving BAX, p53 and caspases. In the murine diabetic model, this increase in apoptosis results in fetal resorption or malformation. Both these adverse pregnancy outcomes are more common in diabetic women. One focus of our lab is how decreased intracellular glucose triggers apoptosis and how this manifests as pregnancy loss or malformation.

We have also demonstrated that hyperinsulinemia and high IGF-1 levels, associated with polycystic ovary syndrome, lead to decreased insulin-stimulated glucose transport and increased apoptosis at a blastocyst stage. We are interested in how GLUT8 and the insulin signalling pathways are involved in apoptosis, blastocyst development and metabolism. Dysregulation of this transporter is responsible for the apoptosis at this stage and thus may be related to the increased miscarriage rate experienced by

these women. Projects in the lab are also investigating mechanisms responsible for GLUT8 translocation and fusion with the plasma membrane involving v- and t-SNARE proteins. Visit our website at [www.obgyn.wustl.edu/moleylab/index.asp](http://www.obgyn.wustl.edu/moleylab/index.asp).

Yoel Sadovsky, M.D., 503 Maternity Hospital, 747-0937. In our laboratory we focus on reproductive development and function. First, we study the mechanisms that determine placental differentiation and function during human pregnancy. This process proceeds from mononucleated cytotrophoblast to a terminally differentiated syncytiotrophoblast, and may be disrupted by diverse insults such as hypoxia and malnutrition, which lead to fetal growth restriction. We focus on genes that modulate trophoblast differentiation and function. Using DNA micro-arrays and real time expression analysis we correlate phenotypic changes with alterations in gene expression. We analyze the expression and activity of proteins that play a central role in trophoblast function, such as the PPAR family of proteins and their role in feto-placental differentiation and uptake of fatty acids.

Our lab also dissects the molecular mechanisms underlying gonadal function. We focus on the nuclear receptor steroidogenic factor 1 (SF-1). This "orphan" member of the nuclear receptor superfamily of transcriptional regulators is essential for reproductive and endocrine homeostasis, and required for intact development of both female and male gonads, as well as the adrenal gland. Although the significance of SF-1 to reproduction has been clearly demonstrated, its mechanism of action is poorly understood. We utilize molecular and genetic approaches to dissect the transcriptional regulatory functions of SF-1 and their modulation by co-activators and co-repressors. We have identified a synergistic regulation of luteinizing hormone (LH)-beta by SF-1 and early growth response-1 (Egr-1), and currently analyze the mechanism and significance of this synergy in vitro and in transgenic mice. Visit our web site at [www.sadovsky.wustl.edu](http://www.sadovsky.wustl.edu).

## Faculty

**JAMES R SCHREIBER, MD** Head of The Department of Obstetrics and Gynecology, Elaine and Mitchell Yanow Professor of Obstetrics and Gynecology

**JOHN K APPELBAUM, MD** Assistant Professor of Clinical Obstetrics and Gynecology

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## Department's Website

<http://www.obgyn.wustl.edu/>

## Department of Ophthalmology and Visual Sciences

Instruction begins in the first year with examination of the eye and a lecture on various aspects of ocular disease. During the second year, all students receive (via e-mail) the "Ophthalmology Case of the Week." During the third year, students are given the opportunity during the surgery block to spend four weeks on the ophthalmology services. In addition, during the third year there are lectures given to students during the Internal Medicine and Surgery rotations. All students work on the American Academy of Ophthalmology's "Case Studies for Medical Students." The emphasis is on ocular manifestations of common systemic diseases, ocular trauma, and common eye diseases such as cataract and glaucoma. In the fourth year, four-week clinical or research electives are offered.

## Courses

### ***First Year***

Introduction to clinical ophthalmology begins in the first year with a lecture and practicum (peer exam) on taking an ocular history and performing an ocular exam. Emphasis is on ophthalmoscopy. Morton E. Smith, M.D.; staff

### ***Second Year***

During the second year, all students receive (via e-mail) the "Ophthalmology Case of the Week." All students are expected to review each case and submit a diagnosis (via reply e-mail). Toward the end of the second year (April) all students convene for a "feedback/oral quiz" session with Morton E. Smith, M.D.

### ***Third Year***

#### **Third Year clerkship opportunities**

In the third year, students are given the opportunity to spend four weeks of their surgery rotation on the ophthalmology service. The students work closely with the ophthalmology residents and review the differential diagnosis of the "red eye," how to interpret an ophthalmologic consult note, and how to handle an ocular emergency in the emergency room. During this rotation, there is again emphasis on the use of the ophthalmoscope. All third-year students must complete the American Academy of Ophthalmology's "Case Studies in Ophthalmology for Medical Students" and attend the periodic "feedback/oral exam" session with Morton E. Smith, M.D., staff.

### ***Fourth Year***

#### **Electives**

M50 801 OPHTHALMOLOGY

Instructor(s): Morton E. Smith, M.D., 747-5559 or 362-5722

Location: McMillan Hospital, Room 114, Barnes-Jewish Hospital, South Campus

Elective Contact: Morton Smith, M.D., 747-5559 or Mary Hitt, 362-5722

Other Information: All students interested in this senior elective must meet with Dr. Morton E. Smith in March of year WUMS III. Students should report to Room 114, McMillan Hospital, 8:00 a.m. first day of elective.

Enrollment limit per period: 6

Valid start weeks are: Weeks 1, 9, 13.

This elective is for senior students who plan to apply for a residency in ophthalmology. The student rotates through one or more specific clinics including the general eye clinic at Barnes-Jewish Hospital and/or the subspecialty clinics of the full time faculty of the Washington University Medical School Department of Ophthalmology and Visual Sciences (e.g. pediatric ophthalmology clinic at St. Louis Children's Hospital, neuro-ophthalmology service, cornea/external disease service, etc.) The student's responsibilities progress from observation (including observing surgery) to complete eye exam to

presentation of patients to the director of that particular service. Several cases must be presented to Dr. Morton Smith. The student must also work on the "Case Studies in Ophthalmology for Medical Students" (from the American Academy of Ophthalmology) and present the answers to these cases in the form of an oral exam to Dr. Morton Smith. The students must attend all conferences as well as Grand Rounds, Wednesday Night Seminar for residents, and spend one night a week (until 9 p.m.) with the ophthalmology resident on call for emergencies. By the end of the four-week rotation, the student is expected to be proficient in taking an ocular history and performing a complete eye exam including slit lamp biomicroscopy and indirect ophthalmoscopy. All students interested in this senior elective must meet with Dr. Morton E. Smith in March of year WUMS III. The final grade of the student is determined by the narrative input from the director of the particular service(s) through which the student rotated, plus the case presentations to Dr. Smith, plus the oral quiz on the "Case Studies" book. The grades at Washington University are Honors, High Pass, Pass, Fail. Student time distribution: Inpatient 5%, Outpatient 80%, Conferences/ Lectures 15%, Subspecialty Care 100%

Major teaching responsibility: Attendings, fellows and residents

Patients seen/weekly: 40

On call/weekend responsibility: 1 night per week (until 9:00 p.m.)

## **Research**

### **(M50 900)**

Usha P. Andley, Ph.D., 1114-B McMillan, 362-7167. Crystallins and lens cell biology. Crystallins play an essential refractive role and maintain lens transparency. However, the role of the molecular chaperone  $\alpha$ -crystallin is still poorly understood. Recently, Dr. Andley's laboratory has shown that  $\alpha A$  or  $\alpha B$ -crystallin expression alters the regulation of lens epithelial cell growth, and protects cells from stress-induced death. Mutations in these proteins are the basis of several inherited cataracts. Using genetic approaches, the laboratory is now focusing on visualizing DNA synthesizing cells in vivo in the  $\alpha A$  and  $\alpha B$  knockout mice, and the interaction of  $\alpha A$  and  $\alpha B$  with cell cycle proteins. These studies use confocal microscopy, flow cytometric and biochemical techniques to study the role of  $\alpha$ -crystallin in the cell cycle. Time-lapse video microscopy is being used to visualize the protein in living cells. Other studies focus on the role of  $\alpha A$  in the cross talk between cell proliferation and apoptosis in the lens epithelium.

Steven Bassnett, Ph.D., 109 McMillan, 362-1604. Currently, we are using advanced microscopic techniques to elucidate the cellular basis of accommodation and presbyopia.

David C. Beebe, Ph.D., 101 McMillan, 362-1621. My laboratory is interested in the molecular and cellular mechanisms that regulate the development of the anterior segment of the eye (the lens and cornea) and the mechanisms responsible for the formation of maturity-onset cataracts.

For our studies of eye development, we are using tissue-specific gene targeting to demonstrate the importance of signaling by specific growth factors for the normal formation and function of the lens and cornea. This powerful new approach allows us to delete genes that are essential for normal cell function and differentiation in only one or a few tissues in the eye. Coupled with the gene targeting approach, we are using high density "gene chip" microarrays to follow changes in the expression of > 10,000 genes in a single experiment. Combining these approaches has allowed us to reveal the mechanisms underlying eye development and function with a sensitivity and specificity not previously attainable. Our gene chip studies have uncovered several unexpected patterns of gene expression in the lens. Several projects are available in the laboratory to follow up on these findings and to extend our work on the lens to the development and renewal of the corneal epithelium.

Cataracts are the leading cause of blindness worldwide and cataract surgery is the most expensive procedure in the US Medicare budget. We recently provided evidence that changes in the eye with aging (specifically, degeneration of the vitreous body and separation of the vitreous body from the surface of the retina) cause the lens to be exposed to higher levels of oxygen and that oxygen toxicity is the cause of the most common type of age-related cataracts. One or two clinically related projects are available to confirm and extend these observations.

Shiming Chen, Ph.D., 618 McMillan, 747-4350. Molecular basis of retinal specific gene expression and hereditary retinal degeneration. This elective is for students who are interested in gaining research experience in molecular vision and retinal diseases. The research will mainly focus on transcription factors that are expressed in the retinal photoreceptor cells and required for the normal development of photoreceptor function and/or linked to photoreceptor degenerative diseases. Students will learn basic molecular and biochemical approaches commonly used for (1) studying target genes and regulatory network for tissue-specific transcription factors, (2) in vitro functional analysis of mutated

factors carrying genetically identified mutations as a tool to find phenotype and genotype correlations, and (3) how to apply the above knowledge to develop early diagnosis and therapeutic interventions to the photoreceptor diseases. Both hands-on experience and experimental design skills will be covered during the course. A small project will be assigned to each student. By the end of the course, each student will give an oral presentation on the progress of the project in a lab meeting and/or a departmental seminar setting.

Thomas A. Ferguson, Ph.D., 1207 McMillan, 362-3745. Cellular and molecular regulation of the ocular immune response.

Mae Gordon, Ph.D., 1125 Old Shriners, 362-3716.

1. Multicenter randomized clinical trial to determine if medical treatment of ocular hypertension prevents or delays glaucomatous optic nerve damage.
2. Quality-of-life assessment.
3. Multicenter epidemiological study of keratoconus.

J. William Harbour, M.D., 603A McMillan, 747-1738. Tumorigenesis and regulation of cell growth, treatment of ocular tumors.

M. Rosario Hernandez, D.D.S., 108 McMillan, 747-1448. Molecular and cellular mechanisms underlying glaucomatous optic neuropathy in humans. The broad objective of our research is to demonstrate the role of reactive astrocytes in the specific changes that occur in the optic nerve head in glaucoma. Elevated intraocular pressure is the major risk factor in glaucoma, a common blinding disease. The mechanisms of retinal ganglion cell loss are unknown but most evidence points to the optic nerve head as the site of injury to the axons.

Our laboratory investigates cellular and molecular mechanisms involved in intraocular pressure-related axon degeneration and in optic nerve head remodeling in human glaucoma. We are focused on the role of astrocytes in the pathogenesis of glaucoma and on defining astrocyte responses to elevated intraocular pressure compared with other forms of cellular stress. These studies are conducted in human optic nerve heads with glaucoma using morphological and molecular techniques adapted for our samples. The findings in human tissues are further tested in a primate model of experimental glaucoma and in acute axonal damage in optic nerve transection.

We have developed several in vitro models using cultured human optic nerve astrocytes to test the effects of elevated pressure and to compare with other mediators of neural degeneration. Using microarrays, we have identified molecular pathways that may be involved in the transition of quiescent astrocytes to the reactive phenotype in response to elevated pressure that are promising targets to test in the future.

David A. Leib, Ph.D., 1114C McMillan, 362-3826. Latency, pathogenesis and molecular genetics of herpes simplex virus.

Peter Lukasiewicz, Ph.D., 1003C McMillan, 362-4284. Roles of receptors for inhibitory and excitatory amino acids in retina. Neurobiology of the vertebrate retina.

Arthur H. Neufeld, Ph.D., 613 McMillan, 747-1487. Pharmacologic neuroprotection of the optic nerve in glaucoma.

Judy Ogilvie, Ph.D., 2019 CID Building, 977-0280, ogilviej@vision.wustl.edu. Photoreceptor cell development, degeneration, and protection.

1. Neurotrophic factors protect rod photoreceptors in many animal models of retinal degeneration. Paradoxically, numerous studies have failed to localize the corresponding receptors to rods, suggesting indirect action through other cells. Our lab is investigating the endogenous role of these factors in the retina and how they act on photoreceptors using mutant mice and retinal organ culture.
2. Mucopolysaccharidoses are a family of lysosomal storage diseases. We are investigating whether gene therapy improves retinal structure and function in mouse models of MPS diseases.

J. Mark Petrash, Ph.D., 1115 McMillan, 362-3335. Molecular biology of inherited vision diseases. A senior elective is available for medical students who wish to participate in ongoing research on mechanisms of cataract and diabetic eye disease. Candidates will utilize laboratory procedures such as real time PCR, confocal microscopy, and assist with characterization of transgenic animal models of inherited eye diseases.

Nathan Ravi, M.D., Ph.D., 623 McMillan, 747-4458. Development of biomaterials for ophthalmic applications.

Carl Romano, Ph.D., 1003B McMillan, 362-2676. Role of receptors for excitatory amino acids (EAAs) in the vertebrate retina.

Alan Shiels, Ph.D., 625 McMillan, 362-1637, shiels@vision.wustl.edu. Molecular Genetics of Eye Disorders. Our research aims to map, identify and characterize genetic determinants of familial eye disorders including (but not limited to); cataract and glaucoma. This senior elective will involve ascertainment, recruitment and clinical review of families with eye disorders from the St. Louis population in conjunction with molecular genetic studies:

1. Genetic linkage/association studies: Genome-wide markers are being used to map genes for early-onset forms of cataract and glaucoma. To date we have been involved in mapping seven loci for clinically distinct forms of autosomal dominant cataract on chromosomes 1p, 1q, 2q, 13q, 17p, 21q and 22q. These mapping studies will provide a molecular basis for understanding the clinical heterogeneity of inherited cataract and glaucoma and will complement further mapping strategies designed to identify genetic determinants of age-related cataract and glaucoma.
2. Pathogenetic studies: We have identified cataract-associated mutations in the human genes for crystallins (CRYAA, CRYBB1, CRYGD) and connexins (GJA3, GJA8), and the mouse gene for an aquaporin (Aqp0). Crystallins establish a high cytoplasmic refractive index, connexins mediate the intercellular transport of ions and second messengers, and aquaporins facilitate water transport across cell membranes. Transgenic and expression profiling techniques are being used to characterize the pathologic mechanisms resulting from underlying mutations in these genes and provide new insights regarding lens development in health and disease.

Patrick M. Stuart, Ph.D., 1215 McMillan, 362-6774. Virology. Investigate the role viral-induced immune responses play in corneal pathology seen in recurrent herpetic keratitis. Also study the role that Yersinia enterocolitica-produced superantigen plays in both the pathogenesis of this organism as well as its possible connection to the development of the autoimmune disease, Reiter's Syndrome.

Patrick M. Stuart, Ph.D., 1207B McMillan, 362-9336.

1. Mechanisms of corneal allograft and responses.
2. Mechanisms of microbial-lymphocyte interactions.

Larry Tycksen, M.D., 2589 Eye Clinic, St. Louis Children's Hospital, 454-6026. Pediatric Ophthalmology:

1. Development of the visual brain and eye alignment.
2. Visual cortex development, ocular alignment, strabismus.

Russell Van Gelder, M.D., Ph.D., 1204 McMillan, 362-4286.

1. Molecular biology of circadian photoreception.
2. Uveitis and ocular inflammation.
3. Polymerase chain reaction diagnosis and discovery of uveitis pathogens.

## Faculty

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**CARLA J SIEGFRIED, MD** Assistant Professor of Ophthalmology and Visual Sciences

**CHARLES D SIGNORELLI, OD** Adjunct Instructor in Ophthalmology and Visual Sciences

**MORTON EDWARD SMITH, MD** Lecturer in Ophthalmology and Visual Sciences

**CLAUD RANDALL SNOWDEN, OD** Adjunct Instructor in Ophthalmology and Visual Sciences

**CRAIG H SORCE, OD** Adjunct Instructor in Ophthalmology and Visual Sciences

**MARK H SPURRIER, MD** Instructor in Clinical Ophthalmology and Visual Sciences

**ARTHUR WALDO STICKLE, JR, MD** Assistant Professor Emeritus of Clinical Ophthalmology and Visual Sciences

**JAMES F STRIETER, OD** Adjunct Instructor in Ophthalmology and Visual Sciences

**PATRICK MICHAEL STUART, PHD** Research Assistant Professor of Ophthalmology and Visual Sciences

**BRIAN PATRICK SUMNER, OD** Adjunct Instructor in Ophthalmology and Visual Sciences

**KENNETH V SWANSON** Instructor in Clinical Ophthalmology and Visual Sciences

**PAUL M TESSER, MD, PHD** Instructor in Clinical Ophthalmology and Visual Sciences

**MATTHEW A THOMAS, MD** Associate Professor of Clinical Ophthalmology and Visual Sciences

**LINDA MEI-LIN TSAI, MD** Assistant Professor of Ophthalmology and Visual Sciences

**ROBERT LAWRENCE TYCHSEN, MD** Professor of Ophthalmology and Visual Sciences

**RUSSELL N VAN GELDER, MD, PHD** Assistant Professor of Ophthalmology and Visual Sciences

**GARY LEE VOGEL, OD** Adjunct Instructor in Ophthalmology and Visual Sciences

**JAMES J WACHTER, OD, BS** Adjunct Instructor in Ophthalmology and Visual Sciences

**WILLIAM LEE WALTER, MD** Assistant Professor of Clinical Ophthalmology and Visual Sciences

**DONALD E WALTER, JR, OD** Adjunct Instructor in Ophthalmology and Visual Sciences

**STEPHEN R WALTMAN, MD** Professor of Clinical Ophthalmology and Visual Sciences

**STEPHEN ALAN WEXLER, MD** Associate Professor of Clinical Ophthalmology and Visual Sciences

**JASON CRAIG WICKENS, MD** Instructor in Ophthalmology and Visual Sciences

**RICHARD HARRIS WIEDER, MD** Assistant Professor of Ophthalmology and Visual Sciences

**MICHAEL L WOLF, OD** Adjunct Instructor in Ophthalmology and Visual Sciences

**MITCHEL L WOLF, MD** Associate Professor of Ophthalmology and Visual Sciences

**MING-FONG AGNES WONG, MD, PHD** Adjunct Assistant Professor of Ophthalmology and Visual Sciences

## Department's Website

<http://ophthalmology.wustl.edu/>

## Department of Orthopaedic Surgery

The Department of Orthopaedic Surgery has educational activities at several affiliated hospitals including Barnes-Jewish Hospital, St. Louis Children's Hospital, Shriners Hospital for Children,

Barnes-Jewish West County Hospital and the Veterans Affairs Medical Center. Students have the opportunity to gain experience on the following services: Hand; Shoulder and Elbow; Spine; Sports Medicine; Trauma; Foot and Ankle, Physiatry (Rehab); Multiservice Orthopaedics at the Veterans Affairs Medical Center; and Pediatric Orthopaedic Surgery. It is anticipated that students will assist in the care of patients in the surgical wards, scrub in on operative procedures, attend outpatient clinics and participate in the coverage of the Emergency Room while working with orthopaedic house staff and attending surgeons. All students on Orthopaedic Surgery also participate in program-wide conferences on Tuesday, Wednesday and Thursday mornings in addition to service conferences at each of the individual hospitals.

## **Courses**

### ***Third Year***

The third-year student rotations are four weeks in length. Because of the popularity of the specialty, several rotations have been established within the third-year clerkship, M95 790 Integrated Surgical Disciplines. These include: Pediatric Orthopaedic Surgery at Shriners Hospital with Perry L. Schoenecker, M.D.; Pediatric Orthopaedic Surgery at St. Louis Children's Hospital with J. Eric Gordon, M.D.; General Orthopaedic Surgery at the Veterans Administration Medical Center with Gary A. Miller, M.D.; Sports Medicine at Barnes-Jewish West County campus with Matthew J. Matava, M.D.; Orthopaedic Surgery at Barnes-Jewish Hospital north campus with Martin I. Boyer, M.D., an all-clinical orthopaedic elective; and a Physical Medicine and Rehabilitation elective with Heidi Prather, D.O., and John P. Metzler, M.D. In addition to operative and clinical experience, students participate in weekly tutorials on orthopaedic physical examination with faculty members.

### ***Fourth Year***

#### **Electives**

##### **M95 839 ORTHOPAEDIC SPORTS MEDICINE**

Instructor(s): Rick Wright, M.D., 747-2543

Location: Barnes-Jewish Hospital, Barnes-Jewish West County Hospital

Elective Contact: Orthopaedic Surgery Education Office, 747-2543, [orthosurg@msnotes.wustl.edu](mailto:orthosurg@msnotes.wustl.edu)

Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This clinical elective is available for four weeks during which the student participates in orthopaedic conferences, outpatient clinics, surgical cases and patient rounds on the Sports Medicine service. Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Rick Wright, M.D.

Patients seen/weekly: Varies

On call/weekend responsibility: Varies

##### **M95 840 ORTHOPAEDIC SURGERY--FOOT/ANKLE**

Instructor(s): Jeff Johnson, M.D., 747-2543

Location: Barnes-Jewish Hospital, Barnes-Jewish West County Hospital

Elective Contact: Orthopaedic Surgery Education Office, 747-2543, [orthosurg@msnotes.wustl.edu](mailto:orthosurg@msnotes.wustl.edu)

Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This clinical elective is available for four weeks during which the student participates in orthopaedic conferences, outpatient clinics, surgical cases and patient rounds. The medical students electing this rotation will serve as an active and integral part of the orthopaedic team.

Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Faculty attendings and resident mentors

Patients seen/weekly: Varies

On call/weekend responsibility: Varies -- generally one weekend call every two weeks

#### M95 842A ORTHOPAEDIC SHOULDER/ELBOW SURGERY

Instructor(s): Ken Yamaguchi, M.D., 747-2543

Location: Barnes-Jewish Hospital

Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthosurg@msnotes.wustl.edu

Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Clinical elective available, during which time the student will work with attending surgeons primarily at Barnes-Jewish Hospital. Activities will include participation in the care of hospitalized inpatients, participation in inpatient and outpatient procedures, attendance at designated attending office hours, attendance at designated orthopaedic conferences and dissection of upper-extremity anatomical specimens.

Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Faculty attendings and resident mentors

Patients seen/weekly: Varies

On call/weekend responsibility: Varies -- generally one weekend call every two weeks

#### M95 842B

##### ORTHOPAEDIC SHOULDER/ELBOW SURGERY

Instructor(s): Leesa Galatz, M.D., 747-2543

Location: Barnes-Jewish Hospital

Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthosurg@msnotes.wustl.edu

Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Clinical elective available, during which time the student will work with attending surgeons primarily at Barnes-Jewish Hospital. Activities will include participation in the care of hospitalized inpatients, participation in inpatient and outpatient procedures, attendance at designated attending office hours, attendance at designated orthopaedic conferences and dissection of upper-extremity anatomical specimens.

Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Faculty attendings and resident mentors

Patients seen/weekly: Varies

On call/weekend responsibility: Varies -- generally one weekend call every two weeks

#### M95 845A ORTHOPAEDIC HAND AND UPPER EXTREMITY SURGERY

Instructor(s): Martin I. Boyer, M.D., 747-2543

Location: Barnes-Jewish Hospital, Barnes-Jewish West County Hospital

Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthosurg@msnotes.wustl.edu

Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 17, 21, 25, 29, 33, 37, and 41.

Clinical elective available, during which time the student will work with attending surgeon primarily at Barnes-Jewish Hospital. Activities will include participation in the care of hospitalized inpatients, participation in inpatient and outpatient procedures, attendance at designated attending office hours, attendance at designated orthopaedic conferences and dissection of upper-extremity anatomical specimens.

Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Faculty attending and resident mentors

Patients seen/weekly: Varies

On call/weekend responsibility: Varies -- generally one weekend call every two weeks

#### M95 845B ORTHOPAEDIC HAND AND UPPER EXTREMITY SURGERY

Instructor(s): Charles Goldfarb, M.D., and Paul Manske, M.D., 747-2543

Location: Barnes-Jewish Hospital, Shriners Hospital for Children, and St. Louis Children's Hospital

Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthosurg@msnotes.wustl.edu

Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Clinical elective available, during which time the student will work with attending surgeons primarily at Barnes-Jewish Hospital. Activities will include participation in the care of hospitalized inpatients, participation in inpatient and outpatient procedures, attendance at designated attending office hours, attendance at designated orthopaedic conferences and dissection of upper-extremity anatomical specimens. Please note that the hand/upper extremity fellow assigned to Dr. Manske's service will also participate in the instruction of students choosing this elective.

Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Faculty attendings and resident mentors

Patients seen/weekly: Varies

On call/weekend responsibility: Varies -- generally one weekend call every two weeks

#### M95 845C ORTHOPAEDIC HAND AND UPPER EXTREMITY SURGERY

Instructor(s): Richard H. Gelberman, M.D., 747-2543

Location: Barnes-Jewish Hospital, Barnes-Jewish West County Hospital

Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthosurg@msnotes.wustl.edu

Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Clinical elective available, during which time the student will work with attending surgeon primarily at Barnes-Jewish Hospital. Activities will include participation in the care of hospitalized inpatients, participation in inpatient and outpatient procedures, attendance at designated attending office hours, attendance at designated orthopaedic conferences and dissection of upper-extremity anatomical specimens.

Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Richard Gelberman, M.D.

Patients seen/weekly: Varies

On call/weekend responsibility: Varies--generally one weekend call every two weeks

#### M95 846 ORTHOPAEDIC TRAUMA

Instructor(s): Joseph Borrelli, M.D., 747-2543, and William Ricci, M.D., 747-2543

Location: Barnes-Jewish Hospital

Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthosurg@msnotes.wustl.edu

Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Clinical elective available for a four-week period, during which time the student will work in orthopaedic trauma at Barnes-Jewish Hospital. Activities will include participation in the care of hospitalized inpatients, participation in inpatient and outpatient procedures, attendance at designated orthopaedic conferences and participation in ongoing research projects.

Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Faculty attendings and resident mentors

Patients seen/weekly: Varies

On call/weekend responsibility: Varies - generally one weekend call every two weeks

#### M95 848 ORTHOPAEDIC PEDIATRIC SURGERY

Instructor(s): Eric Gordon, M.D., 747-2543

Location: St. Louis Children's Hospital

Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthosurg@msnotes.wustl.edu

Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Clinical elective available for four weeks during which time the student will work with attending surgeon primarily at St. Louis Children's Hospital observing and assisting in outpatient and inpatient care. To be included are activities in the OR, ER, and outpatient clinics. Attendance at and participation in the weekly pediatric orthopaedic conference activities required.

Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Faculty attendings and resident mentors

Patients seen/weekly: Varies

On call/weekend responsibility: Varies -- generally one weekend call every two weeks

#### M95 849 ORTHOPAEDIC SPINE SURGERY IN ADULT PATIENTS

Instructor(s): Brett Taylor, M.D., 747-2543

Location: Barnes-Jewish Hospital

Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthosurg@msnotes.wustl.edu

Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This clinical elective is available for four weeks during which time the student will work with the attending surgeon primarily at Barnes-Jewish Hospital observing and assisting when appropriate in outpatient and inpatient care. To be included are activities in the OR, ER, and outpatient clinics. Attendance at and participation in the weekly orthopaedic conference activities is required. The spine fellow assigned to this service will serve as a primary contributor to the student's education experience on this rotation.

Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Faculty attending, spine fellow assigned to this service and resident mentors

Patients seen/weekly: Varies

On call/weekend responsibility: Varies -- the student generally participates in Trauma call in the Barnes-Jewish Hospital ER at least once during the week. Additional subspecialty at-home call may be included if desired.

#### M95 853 ORTHOPAEDIC SURGERY--SPORTS

Instructor(s): George A. Paletta, M.D., 747-2543

Location: Barnes-Jewish Hospital, Barnes-Jewish West County Hospital

Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthosurg@msnotes.wustl.edu

Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This clinical elective is available for four weeks during which time the student will participate in orthopaedic conferences, outpatient clinics, surgical cases and patient rounds. The medical students electing this clerkship will serve as an active and integral part of the orthopaedic team.

Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Faculty attendings and resident mentors

Patients seen/weekly: Varies

On call/weekend responsibility: Varies -- generally one weekend call every two weeks

#### M95 859 ORTHOPAEDIC ONCOLOGY

Instructor(s): Douglas J. McDonald, M.D., 747-2543

Location: Barnes-Jewish Hospital

Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthosurg@msnotes.wustl.edu

Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This clinical elective, centered primarily at Barnes-Jewish Hospital, is available for four weeks during which the student participates in orthopaedic conferences, outpatient clinics, surgical cases and patient rounds on the Musculoskeletal Oncology service.

Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Douglas J. McDonald, M.D.

Patients seen/weekly: Varies

On call/weekend responsibility: Varies

#### M95 8991 ORTHOPAEDIC SURGERY EXTERNSHIP (Visiting Students Only)

Instructor(s): Martin I. Boyer, M.D.

Location: 11300 West Pavilion

Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthosurg@msnotes.wustl.edu

Other Information: Students meet in the Education Office (6102 Queeny Tower), 8:00 a.m. first day of the elective.

Enrollment limit per period: Varies

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students rotate on Orthopaedic Services for two- or four-week blocks. Students may choose from hand, sports medicine, trauma, cervical spine, shoulder/elbow, foot/ankle, pediatric and research rotations depending upon availability. Please contact Donna DePond, in the Orthopaedic Education Office, for further information. E-mail address: depond@msnotes.wustl.edu.

Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Faculty attendings and resident mentors

Patients seen/weekly: Varies

On call/weekend responsibility: Varies -- generally one weekend call every two weeks

Please contact the Orthopaedic Surgery Education Office at 747-2543 for further information.

### **Research**

#### **(M95 900)**

Various Orthopaedic Surgery research opportunities are available with the following faculty attendings. If interested, please contact the Education Office at 747-2543, orthosurg@msnotes.wustl.edu or contact the faculty member directly.

Yousef Abu-Amer, Ph.D.

Joseph Borrelli, M.D.

Martin I. Boyer, M.D., F.R.C.S. (C)

R. Stephen Burnett, M.D., F.R.C.S. (C)

John Clohisy, M.D.

Matthew Dobbs, M.D.

Leesa Galatz, M.D.

Richard H. Gelberman, M.D.

Charles A. Goldfarb, M.D.

J. Eric Gordon, M.D.  
Lawrence G. Lenke, M.D.  
Jueren Lou, M.D.  
Scott J. Luhmann, M.D.  
Matthew J. Matava, M.D.  
William Ricci, M.D.  
Timothy Ritty, Ph.D.  
Linda Sandell, Ph.D.  
Perry Schoenecker, M.D.  
Matt Silva, Ph.D.  
Brett Taylor, M.D.  
Stavros Thomopoulos, Ph.D.  
Rick Wright, M.D.  
Ken Yamaguchi, M.D.

## Faculty

**RICHARD H GELBERMAN, MD** Head of The Department of Orthopaedic Surgery, Fred C Reynolds Professor of Orthopaedic Surgery

**YOUSEF ABU-AMER, PHD** Associate Professor of Orthopaedic Surgery

**DONALD R BASSMAN, MD** Instructor in Clinical Orthopaedic Surgery

**JOSEPH BORRELLI, MD** Associate Professor of Orthopaedic Surgery

**MARTIN I BOYER, MD** Associate Professor of Orthopaedic Surgery

**DONALD H BRANCATO, MD** Instructor in Clinical Orthopaedic Surgery

**KEITH HAPP BRIDWELL, MD** Professor of Orthopaedic Surgery

**ROBERT STEPHEN BURNETT, MD** Assistant Professor of Orthopaedic Surgery

**ROBERTO CIVITELLI, MD** Professor of Orthopaedic Surgery

**JOHN C CLOHISY, MD** Assistant Professor of Orthopaedic Surgery

**MARSHALL B CONRAD, MD** Associate Professor of Clinical Orthopaedic Surgery

**LAURA S COPEN, MD** Instructor in Orthopaedic Surgery

**MATTHEW DOBBS, MD** Assistant Professor of Orthopaedic Surgery

**JAMES P EMANUEL, MD** Instructor in Clinical Orthopaedic Surgery

**JACK R. ENGBERG, PHD** Research Associate Professor of Orthopaedic Surgery

**LEE T FORD, JR, MD** Professor Emeritus of Orthopaedic Surgery

**LEESA GALATZ, MD** Assistant Professor of Orthopaedic Surgery

**JEROME J GILDEN, MD** Professor Emeritus of Orthopaedic Surgery

**LOUIS ARNOLD GILULA, MD** Professor of Orthopaedic Surgery

**JORDAN GINSBURG, MD** Assistant Professor of Clinical Orthopaedic Surgery

**CHARLES A GOLDFARB, MD** Assistant Professor of Orthopaedic Surgery

**J. ERIC GORDON, MD** Associate Professor of Orthopaedic Surgery

**MARK E. HALSTEAD** Instructor in Orthopaedic Surgery

**RONALD C HERTEL, MD** Instructor in Clinical Orthopaedic Surgery



**ZHENGMIN HUANG, PHD** Research Assistant Professor of Orthopaedic Surgery  
**GLEN E JOHNSON, MD** Instructor in Clinical Orthopaedic Surgery  
**JEFFREY E JOHNSON, MD** Associate Professor of Orthopaedic Surgery  
**ROBERT S KRAMER, MD** Instructor in Clinical Orthopaedic Surgery  
**ROBERT E KUHLMAN, MD** Assistant Professor Emeritus of Clinical Orthopaedic Surgery  
**ROBERT CRAIG LANDER, MD** Instructor in Clinical Orthopaedic Surgery  
**W. EDWARD LANSCHKE, MD** Instructor in Clinical Orthopaedic Surgery  
**LAWRENCE G LENKE, MD** Professor of Orthopaedic Surgery  
**J. OTTO LOTTES, MD, BS, BS** Assistant Professor Emeritus of Clinical Orthopaedic Surgery  
**JUEREN LOU, MD** Research Associate Professor of Orthopaedic Surgery  
**CHARLES IRWIN MANNIS, MD** Instructor in Clinical Orthopaedic Surgery  
**PAUL R MANSKE, MD** Professor of Orthopaedic Surgery  
**MATTHEW J MATAVA, MD** Assistant Professor of Orthopaedic Surgery  
**AUDREY MCALINDEN** Research Assistant Professor of Orthopaedic Surgery  
**JOHN A MCCARTHY, MD** Research Instructor in Orthopaedic Surgery  
**DOUGLAS J. MCDONALD, MD** Professor of Orthopaedic Surgery  
**JOHN P METZLER, MD** Instructor in Orthopaedic Surgery  
**GARY ARTHUR MILLER, MD** Associate Professor of Orthopaedic Surgery  
**MARVIN R MISHKIN, MD** Assistant Professor of Clinical Orthopaedic Surgery  
**HARRY C MORGAN, MD, BS** Associate Professor of Clinical Orthopaedic Surgery  
**ALAN H MORRIS, MD** Instructor in Clinical Orthopaedic Surgery  
**MARGARET MARY OAKLEY, MD** Instructor in Clinical Orthopaedic Surgery  
**GEORGE A PALETTA, MD** Associate Professor of Orthopaedic Surgery  
**TERRENCE L PIPER, MD** Assistant Professor of Clinical Orthopaedic Surgery  
**HEIDI PRATHER, DOST** Assistant Professor of Orthopaedic Surgery  
**WILLIAM M RICCI, MD** Assistant Professor of Orthopaedic Surgery  
**K. DANIEL RIEW, MD** Associate Professor of Orthopaedic Surgery  
**BARRY L SAMSON, MD** Instructor in Clinical Orthopaedic Surgery  
**LINDA J SANDELL, PHD** Professor of Orthopaedic Surgery  
**PAUL SANTIAGO** Assistant Professor of Orthopaedic Surgery  
**PERRY LEE SCHOENECKER, MD** Professor of Orthopaedic Surgery  
**JOHN JOSEPH SHERIDAN, MD** Instructor in Clinical Orthopaedic Surgery  
**ROBERT ARTHUR SHIVELY, MD** Assistant Professor of Orthopaedic Surgery  
**MATTHEW J SILVA, PHD** Associate Professor of Orthopaedic Surgery  
**TODD J. STEWART** Assistant Professor of Orthopaedic Surgery  
**BRETT A TAYLOR, MD** Assistant Professor of Orthopaedic Surgery  
**STAVROS THOMOPOULOS** Assistant Professor of Orthopaedic Surgery  
**WILLIAM GENE TOTTY, MD** Professor of Orthopaedic Surgery  
**NEILL MARSHALL WRIGHT, MD** Assistant Professor of Orthopaedic Surgery  
**RICK WAYNE WRIGHT, MD** Assistant Professor of Orthopaedic Surgery  
**KEN YAMAGUCHI, MD** Associate Professor of Orthopaedic Surgery

**Department's Website**

## **Department of Otolaryngology**

Otolaryngology is presented to students in the first-, second-, third- and fourth-year classes. Physical diagnosis skills are taught in the first year. Clinically oriented lectures and a physical diagnosis workshop are presented to second-year students. In the third year of the medical curriculum, four-week elective rotations on one of the services in East Pavilion, the Veterans Administration Medical Center or St. Louis Children's Hospital are offered. During this period, there is teaching at the bedside, in the operating room and in the clinic, supplemented by daily afternoon lectures, Grand Rounds on Wednesdays, and an introduction to audiology.

Fourth-year students interested in ENT as a specialty may take a two- to four-week elective designed to give them exposure to patient care, both in the outpatient clinic and the operating room and postoperative setting. An additional four-week elective that provides comprehensive ambulatory experience is offered to students headed for primary care.

## **POSTGRADUATE PROGRAM**

The postgraduate program in Otolaryngology at Washington University consists of one year of general surgery and four years of otolaryngology. A two-year research position is offered for two selected candidates from each class. During the clinical years of training, residents rotate on various services, which include the Head and Neck Surgery Service at Barnes-Jewish Hospital, the ENT Clinic, Otology, the Veterans Administration Medical Center, St. Louis Children's Hospital and Facial Plastic and Reconstruction. During that time, the resident serves in all aspects of patient care, including the outpatient clinic, inpatient hospital care and the operating room, as well as the various ENT diagnostic laboratories, such as vestibular and audiology. An increasing degree of responsibility is given to residents as they proceed during the training program, depending upon the year in training and the resident's professional development during this time. Didactic teaching consists of a basic science course during the first year of clinical residency and a two-year rotating core curriculum lecture series throughout the residency. There is also a temporal bone otology course, as well as a head and neck dissection course. Additional conferences include Grand Rounds, Morbidity and Mortality Conference, Journal Club, Otology Conference and Joint Tumor Conference. During the clinical years, residents are expected to participate in clinical and/or basic research and to publish papers in peer-reviewed journals, and they are expected to make presentations at the lectures or Grand Rounds. They are encouraged to submit papers and to make presentations at regional and national otolaryngology meetings. There is a national course consisting of literature given by the American Academy of Otolaryngology in which residents are expected to participate throughout the year. There is also an In-Training Examination given by the American Academy of Otolaryngology that all residents must take on a yearly basis. Throughout their residency, residents receive training in all aspects of otolaryngology, including general otolaryngology; head and neck cancer surgery; microvascular reconstructive techniques; facial plastic surgery; trauma; otology and neurotology; pediatric otolaryngology, including pediatric endoscopy; and allergy and endoscopic nasal sinus surgery.

## **CENTRAL INSTITUTE FOR THE DEAF AT WASHINGTON UNIVERSITY SCHOOL OF MEDICINE**

Washington University School of Medicine assumed ownership of CID's hearing research, adult clinical care and advanced degree programs, as well as of its newly built 66,000-square-foot campus and research facilities at 4560 Clayton Avenue in the Washington University Medical Center in September 2003. These programs are now part of Washington University School of Medicine's Department of Otolaryngology. They continue to advance CID's mission to help people with hearing loss under the name CID at Washington University School of Medicine. The additional research laboratories have given the University one of the largest otolaryngology departments in the world, creating an international powerhouse in the field of hearing and deafness.

The University manages CID's graduate degree programs through its newly named Program in Audiology and Communication Sciences offering a Ph.D. degree in Speech and Hearing Sciences, an AuD degree in Audiology, and a M.S. degree in Deaf Education (See the Graduate Programs' "Program in Audiology and Communication Sciences.") CID provides faculty and practicum sites for the programs in deaf education and audiology and collaborates on applied research studies involving children with hearing loss. The Spencer T. Olin Hearing Clinic, on the CID campus, is in the Division of Adult Audiology. Work also continues in the Harold W. Siebens Hearing Research Center, which houses the Fay and Carl Simons Center for Biology of Hearing and Deafness and the Center for Childhood Deafness and Adult Aural Rehabilitation. All of the CID at Washington University School of

Medicine programs share a campus with the CID Oral School and Outreach Center.

## **Courses**

### ***First Year***

#### Otolaryngology Clinical Skills

Introductory lecture and group sessions pertaining to the complete head and neck examination. After the one-hour lecture, students will be divided into small groups to learn the otoscopic, nasal, oral cavity and neck examination to be proctored by physicians from the ENT department.

### ***Second Year***

#### M55 660B Clinical Topics in Otolaryngology

Instructors: James M. Hartman, M.D., 362-8641; Joel A. Goebel, M.D., 747-0553

This course consists of six introductory lectures on common diseases of the head and neck, including head and neck carcinoma, hearing loss and dizziness, otitis media, sinusitis and otolaryngologic emergencies. Each lecture is highlighted by case presentations and treatment options in addition to pathophysiology. This course follows the physical examination practicum given earlier in the academic year.

### ***Fourth Year***

## **Electives**

#### M55 801 OTOLARYNGOLOGY

Instructor(s): Joel Goebel, M.D., 747-0553

Location: 9916 McMillan

Elective Contact: Maria Harrington, 747-0553

Other Information: Students considering a career in otolaryngology should speak to Dr. Goebel prior to scheduling this elective. Prior to first day of elective student should contact Dr. Goebel to discuss options of elective and to ascertain starting time and location.

Enrollment limit per period: Limit 3/period for Weeks 1 and 5; 2/period for Weeks 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Four-week rotation includes evaluation of ENT problems presented to specialist for diagnosis and treatment. The student participates in the clinic, hospital and operating room. This also includes time on the Pediatric ENT Service, Audiology, Voice Laboratory and Vestibular Evaluation Laboratory. Option of rotation on the ENT Service at VAMC is available.

Student time distribution: Inpatient 40%, Outpatient 40%, Conferences/Lectures 20%; Primary Care 20%, Subspecialty Care 80%

Major teaching responsibility: Attendings and residents

Patients seen/weekly: 50

On call/weekend responsibility: Every fourth day

#### M55 802 GENERAL OTOLARYNGOLOGY

Instructor(s): Joel Goebel, M.D., 747-0553

Location: 9916 McMillan

Elective Contact: Maria Harrington, 747-0553

Other Information: Students considering a career in otolaryngology should speak to Dr. Goebel prior to scheduling this elective. Prior to first day of elective student should contact Dr. Goebel to discuss options of elective and to ascertain starting time and location.

Enrollment limit per period: 1

Valid start weeks for 2-week blocks are: Weeks 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41 and 43.

This two-week elective is an extremely flexible program consisting of several options:

General Ear, Nose and Throat Service: Student functions as a junior resident at either Barnes-Jewish Hospital or John Cochran VA Medical Center. At Barnes-Jewish Hospital, participation in clinic, hospital inpatient and operating room settings would expose student to a broad spectrum of patients. At the VA Hospital the emphasis would be on head and neck tumors.

Head and Neck Service--Barnes-Jewish Hospital: Student functions as junior resident on ENT hospital floor with great deal of exposure to head and neck surgery.

Pediatric Otolaryngology--St. Louis Children's Hospital: Student participates as a junior resident, involved in pre- and postoperative surgical care as well as outpatient medical care.

Preceptorships: Student is assigned to a private practitioner's office functioning in his/her office as well as hospital service.

Other options can be entertained and formulated according to the student's particular needs. Students participating in this elective will be required to spend an afternoon or morning in the Audiology/Vestibular Laboratory learning fundamentals of audiological and vestibular evaluation. Attendance at Monday afternoon conferences as well as Grand Rounds on Wednesday mornings is expected.

Student time distribution: Inpatient 20%, Outpatient 70%, Conferences/ Lectures 10%; Primary Care 40%, Subspecialty Care 60%

Major teaching responsibility: Attendings and residents

Patients seen/weekly: 60

On call/weekend responsibility: None

#### M55 803 PEDIATRIC OTOLARYNGOLOGY

Instructor(s): David W. Molter, M.D., 454-6162

Location: 3S35 St. Louis Children's Hospital

Elective Contact: Patty Tampow, 454-2136

Other Information: Students should report to 3S35, St. Louis Children's Hospital, 8:30 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The student will actively participate in the clinical office, inpatient consultations, and surgery with the attending staff at St. Louis Children's Hospital. Care would be taken to provide experience in the common problems one would see in primary care pediatrics or family practice. Participation in sub-specialty/multidisciplinary clinics such as the Cleft & Craniofacial clinic is encouraged. Opportunity will be provided to learn the fundamentals of audiological evaluation. Students participating in this elective will attend academic conferences in both the pediatric and adult divisions.

Student time distribution: Inpatient 50%, Outpatient 40%, Conferences/ Lectures 10%; Primary Care 30%, Subspecialty care 70%

Major teaching responsibility: Attending physician and residents

Patients seen/weekly: 100

On call/weekend responsibility: At student's discretion

#### M55 820 PRACTICUM IN ADULT CLINICAL AUDIOLOGY

Instructor(s): Michael Valente, Ph.D., 362-7489

Location: 11th Floor, Center for Advanced Medicine (CAM)

Elective Contact: Michael Valente, Ph.D., 362-7489

Other Information: Students should contact Dr. Valente to schedule this elective.

Enrollment limit per period: 8

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Guidance provided in the administration and interpretation of audiometric tests. Emphasis on defining the severity of auditory dysfunction in addition to identifying sites of pathological processes. Theoretical bases of acoustics, anatomy and physiology, and electronics reviewed as they relate to auditory assessment. Modification of conventional test paradigms and hearing aid procedures covered according to each student's interests and needs.

Student time distribution: Inpatient 10%, Outpatient 80%, Conferences/ Lectures 10%; Primary Care

50%, Subspecialty Care 50%  
Major teaching responsibility: Audiology staff  
Patients seen/weekly: 120  
On call/weekend responsibility: None

#### M55 831 NEUROTOLOGY

Instructor(s): Joel Goebel, M.D., 747-0553  
Location: 9th Floor McMillan  
Elective Contact: Maria Harrington, 747-0553  
Other Information: Students should contact Dr. Goebel if interested in this elective.

Enrollment limit per period: 1  
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Active student participation in the physical exam, advanced testing and management of patients with balance dysfunction. Attend patient clinic two days a week and test patients on ENG, rotary chair and computerized platform three days a week. Research participation welcome with prior arrangements. Student time distribution: Outpatient 80%, Conferences/Lectures 20%; Primary Care 10%, Subspecialty Care 90%  
Major teaching responsibility: Attending  
Patients seen/weekly: 40  
On call/weekend responsibility: None

#### M55 833 AMBULATORY OTOLARYNGOLOGY FOR THE PRIMARY CARE PHYSICIAN

Instructor(s): Joel Goebel, M.D., F.A.C.S., 747-0553  
Location: Barnes-Jewish Hospital and St. Louis Children's Hospital clinics  
Elective Contact: Maria Harrington, 747-0553  
Other Information: Students should contact Maria Harrington, 9906 McMillan, 747-0553, prior to the start of this elective.

Enrollment limit per period: 1  
Valid start weeks for 4-week blocks are: Weeks 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This course offers a four-week exposure to ambulatory care of patients with diseases of the head and neck. Eight half-day sessions per week will be offered in attending clinics for general otolaryngology, head and neck cancer, otology and pediatric otolaryngology. Two half-day sessions are reserved for audiology, vestibular lab and voice lab experience. Surgical exposure is available for selected cases as identified by the student and attending physician, but the main goal of this rotation is outpatient diagnosis and management.  
Student time distribution: Outpatient 100%; Primary Care 50%, Subspecialty Care 50%  
Major teaching responsibility: Attendings and residents  
Patients seen/weekly: >100  
On call/weekend responsibility: None

#### M80 841 ART OF ASKING QUESTIONS/PROBLEM SOLVING

Instructor: J. Gail Neely, M.D., F.A.C.S., 362-7344  
Location: 9th Floor McMillan  
Elective Contact: J. Gail Neely, M.D., 362-7344  
Other Information: Students should report to Carole Bradshaw, 804 McMillan, 8:30 a.m. first day of elective.

Enrollment limit per period: 2  
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Medical Intelligence: The Art of Asking Questions and Efficient Clinical Problem Solving. The pressures of continued learning, competitive residency searches, and time constraints can erode the joy and the efficiency of the fundamental principles of medicine, the fiduciary responsibilities to appreciate human values and to practice intelligent medicine. This is a one-on-one mentored program of independent study designed to increase the student's efficiency and enjoyment of the intelligent practice of medicine. The student will set the course of their study. Working with the mentor on a daily basis and using the facilities of the institution, they will learn to efficiently think through clinical cases, use science and the techniques of clinical medicine to expand their understanding of the topic, and to

express their selves effectively. The underlying efficiencies of thought pivot upon the art of asking questions while examining a patient and while reading for discovery.

## **Research**

### **(M55 900)**

The type of research will depend upon the current phase of the research program in each laboratory. Students should contact the director of each laboratory to negotiate.

Barbara A. Bohne, Ph.D., and Gary W. Harding, M.S.E., 1141 and 1144 Shriners Building, 362-7497. Studies of structure and function of the abnormal cochlea. The structure and function of the normal and damaged cochlea are studied in this laboratory. Several projects utilize the chinchilla for determining mechanisms of cell degeneration in the hearing organ following exposure to different ototoxicants such as noise. The chinchilla is excellent for these studies because its hearing is similar to that of humans, it is free of spontaneous middle ear disease and it is feasible to perform surgery on its middle and inner ears, including survival surgery. Current projects with chinchillas involve: (a) injecting an inert tracer particle into the endolymphatic space to determine if, when and for how long the boundaries of the space are disrupted after a particular experimental treatment; and (b) using a novel histological preservation technique termed "survival-fixation" to identify changes in the coupling of the tectorial membrane to the hair-cell stereocilia in animals which have sustained a temporary or a permanent loss of hearing. Certain inbred mice have hereditary hearing losses or develop early age-related hearing loss. Therefore, mice are being used to identify some of the genetic bases for variations in susceptibility to ototoxicants and the age of onset of presbycusis.

Brian T. Faddis, Ph.D., 1020 McMillan, 747-3665, faddisb@wustl.edu. Mechanisms of Middle/Inner Ear Damage. Our lab is interested in the cellular and molecular mechanisms associated with cell injury and tissue destruction in the middle and inner ears. We are currently studying the ability of nitric oxide to activate osteoclastic bone resorption, commonly seen in such middle ear diseases as cholesteatoma and chronic otitis media. We are interested in the roles of specific isoforms of nitric oxide synthase and possible interactions between them. Another focus in the lab is the study of cellular mechanisms of noise-induced hearing loss and how this can be exacerbated by simultaneous exposure to environmental toxins such as common workplace chemicals. Again, nitric oxide may play a key role in this injury because of the variety of NOS isoforms present in these tissues.

A wide variety of techniques are employed to gain a broad understanding of these disease processes at molecular, cellular and organismal levels. We use real time RT-PCR and in situ hybridization to study changes in gene expression, cell and organ culture models to assess injury models in more controlled environments, histological techniques for routine light and electron microscopy, western blotting and immunofluorescence to examine protein and structural changes within cells and tissues, and auditory brainstem response thresholds to correlate hearing sensitivity to specific cellular and molecular challenges.

Students in the lab will typically take some time to become familiar with a variety of projects and techniques before selecting a specific area or project for more in depth and independent study. Students or residents with specific but unrelated research questions that may benefit from the techniques we employ are also welcome to discuss the possibility of conducting these studies in the lab.

Joel A. Goebel, M.D., 8th Floor McMillan, 747-0553. Clinical research testing of posture and ocular motor control. Projects include headshake testing of the vestibulo-ocular reflex (VOR), interlaboratory rotary chair studies, dynamic posturography and outcome research in dizzy patients.

Bruce H. Haughey, M.D., 9903 McMillan, 362-0365. Work in progress is investigating the functional results of allotransplantation of the canine hemitongue. Successful recovery has been observed in five chronic animals, but inhibited in some cases by allograft rejection, despite immunosuppression. Much scope exists for further study of the immunosuppression of tongue tissue and its functional recovery. A new primate study is now approved. Also in progress are clinical studies of rehabilitation following reconstructive surgery of head and neck cancer resections, as well as a clinical data base and a study of outcomes of treatment for recurrent head and neck cancer.

Stephen M. Highstein, M.D., Ph.D., 4566 Scott Avenue, East McDonnell Science Building, 362-1012. The gain of the vestibulo-ocular reflex (VOR) in alert squirrel monkeys can be plastically adapted either acutely over 4-5 hours or chronically over weeks by employing visual/vestibular interactive stimulation. We study the neural substratum of motor learning and memory for this behavior with, (a)

intracellular and extracellular recording, (b) neuroanatomical techniques for marking single neurons and (c) chemical block of selected CNS sites. The patterns of response of single and multiple neurons have led us to construct mathematical models of the neural circuits involved. Brain sites implicated include the brainstem and cerebellum.

We also study the determinants of the response dynamics (phase and gain) of the vestibular horizontal semicircular canal by (a) recording intracellularly from hair cells in situ in different regions of the crista, (b) patch-clamping hair cells isolated from defined regions of the crista, (c) measuring the motion of the cupula of the canal using laser interferometry and/or video microscopy, (d) injecting identified primary afferents with tracer to elucidate their peripheral origins and central projections, and (e) recording chronically in natural settings, from primary afferents and efferents that have regenerated through a multichannel sieve recording electrode. We have arrived at a general theory of the contributions of the biomechanical and neural factors that shape the responses of the canal nerve.

Judith E. C. Lieu, M.D., 3S35 Children's Hospital and 8th Floor McMillan, 454-2138. Clinical Outcomes Research in Pediatric Otolaryngology. The Clinical Outcomes Research office performs clinical epidemiology and health services research. (Please reference the elective offered by Dr. Jay Piccirillo in this department for more details.) These techniques and methodologies are used to investigate clinical problems seen in pediatric otolaryngology. Projects include the follow-up and evaluation of newborn hearing screening programs, progression of hearing loss in children, evaluation of unilateral hearing loss, and the association of reflux disease with otitis media in children. Other projects of the student's choosing that would utilize these research techniques may also be pursued.

J. Gail Neely, M.D., F.A.C.S., 9902 McMillan, 362-7344. Facial Motion Analysis Laboratory: Clinical research application of subtracted digitized image light reflectance. The student(s) will participate in videotaping normal subjects and patients with facial paralysis and synkinesis, in using a unique computer program to analyze dynamic surface deformations during facial expression, and using spread sheet and statistical applications in order to quantitatively define outcomes during treatments of disorders of the facial nerve.

Jay F. Piccirillo, M.D., 8th Floor McMillan, 362-7394. The Clinical Outcomes Research Office of the Division of Research performs basic and applied clinical epidemiology and health services research. Clinical epidemiology is the study of the diagnosis, prognosis and evaluation of treatment. The scientific methodology of clinical epidemiology is based on the architecture of clinical research, biostatistics and data processing. Part of this methodology is borrowed from public health epidemiology and is applied to the uniquely clinical situations that clinicians face. Clinical epidemiology, therefore, is a methodology that can be applied to the study of any and all human disease and illness. Health services research can be defined as efforts to determine how the health system functions so that its performance can be improved. This definition makes the field essentially activist in nature.

Steven B. Scholnick, Ph.D., 10th Floor McMillan, 362-7549, scholnis@msnotes.wustl.edu. Molecular genetics of head and neck tumors. Our goals are twofold: to reach a better understanding of the biology of head and neck cancer and to use that understanding to develop better clinical markers for the assessment of tumor behavior and patient prognosis. To achieve these goals we are using molecular genetic techniques to identify tumor suppressor genes whose inactivation is correlated with poor outcome. Our data suggest that one such gene maps to a small interval within band p23.2 of chromosome 8. In our efforts to clone this gene, we have assembled a BAC contig of this interval as well as a detailed transcript map. We are now analyzing potential candidates for the putative suppressor.

A variety of potential projects will be available ranging from molecular genetic techniques which detect inactivation of these genes, through cell biological investigation of their function as a tumor suppressor, to investigation of their use as a clinical tool for predicting patient prognosis and selecting appropriate treatments.

## Faculty

**RICHARD A CHOLE, MD, PHD** Lindburg Professor of Otolaryngology, Head of The Department of Otolaryngology

**MARC BRUCE ABRAMS, DDENT** Instructor in Clinical Otolaryngology

**BENARD C ADLER, MD** Professor Emeritus of Clinical Otolaryngology

**NAWAL MONA AHMED** Instructor in Clinical Otolaryngology (DDS)

**LOUIS ALTSHULER, DDENT, DDENT** Assistant Professor Emeritus of Clinical Otolaryngology

**MURRAY HOWARD APPELBAUM, DDENT** Instructor in Clinical Otolaryngology (DMD)

**SEAN B BAILEY, MD** Instructor in Clinical Otolaryngology

**RICHARD A. BAIRD, PHD** Research Associate Professor of Otolaryngology

**JIANXIN BAO** Research Assistant Professor of Otolaryngology

**PERRY J BARTELS, DDENT** Instructor in Clinical Otolaryngology

**MARY ELAINE BASSE** Assistant Research Scientist of Otolaryngology

**PABLO M BLAZQUEZ GAMEZ** Research Assistant Professor of Otolaryngology

**BARBARA ANN BOHNE, PHD** Professor of Otolaryngology (Neurobiology)

**GREGORY HARRIS BRANHAM** Associate Professor of Otolaryngology (Pending Executive Faculty Approval)

**DOUGLAS A CARANO, DDENT** Instructor in Clinical Otolaryngology (DDS)

**CHAD PHADUNG CHADARATANA, MD** Instructor in Clinical Otolaryngology

**WILLIAM W. CLARK, PHD** Professor of Otolaryngology (Pending Executive Faculty Approval)

**RANDALL A CLARY, MD, MS** Associate Professor of Otolaryngology

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**WILLIAM MARK COHEN, DDENT** Instructor in Clinical Otolaryngology (DMD)

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**JOHN D DAHM, MD** Instructor in Clinical Otolaryngology

**RICHARD DAVIDSON, DDENT** Instructor in Clinical Otolaryngology (DMD)

**NORMAN STEVEN DRUCK, MD** Assistant Professor of Clinical Otolaryngology

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**CARL F EHRLICH, MD** Instructor in Otolaryngology

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**JAMES A FERNANDEZ, MD** Instructor in Clinical Otolaryngology

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**WILLIAM D GAY, DDENT** Associate Professor of Otolaryngology

**JOEL GOEBEL, MD** Vice Chairman of Otolaryngology, Professor of Otolaryngology

**RICHARD I GOLDBERG, DDENT** Instructor in Clinical Otolaryngology (DMD)

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**STEVEN B SCHOLNICK, PHD** Associate Professor of Otolaryngology  
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**PETER GAILLARD SMITH, MD, PHD** Assistant Professor of Clinical Otolaryngology  
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**MALCOLM H STROUD, MD** Professor Emeritus of Otolaryngology  
**JOHN B. SUNWOO, MD** Assistant Professor of Otolaryngology  
**ISOLDE E THALMANN, PHD** Research Professor of Otolaryngology  
**RUEDIGER THALMANN, MD** Lecturer in Otolaryngology , Professor Emeritus of Otolaryngology  
**STANLEY E THAWLEY, MD** Associate Professor of Otolaryngology  
**LLOYD E THOMPSON, MD** Assistant Professor of Clinical Otolaryngology  
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**THOMAS J VERALDI, DDENT** Instructor in Clinical Otolaryngology  
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**MARK EDWARD WARCHOL, PHD** Research Associate Professor of Otolaryngology  
**CALVIN H WEISS, DDENT** Instructor in Clinical Otolaryngology (DDS)  
**ALAN P WILD, MD** Instructor in Clinical Otolaryngology

## **Department's Website**

<http://oto.wustl.edu/>

## **Department of Pathology and Immunology**

The department is responsible through its Pathology divisions for studying the pathogenesis and the biochemical and anatomical basis of diseases. Pathologists do research on disease processes using molecular, genetic and structural analysis. Pathologists have the responsibility for the cytological and anatomical diagnosis of diseases, and for developing novel chemical and histological approaches for the analysis of them, particularly early cancers and infectious diseases. The Divisions of Anatomic Pathology (with Louis P. Dehner, M.D., as director and Jeffrey E. Saffitz, Ph.D., M.D., heading its Autopsy Service), Laboratory Medicine (headed by Jack H. Ladenson, Ph.D.) and Neuropathology (with Robert E. Schmidt, M.D., Ph.D.) have faculty involved in teaching, clinical service and research. Prominent areas of research include experimental diabetes, hematology, bone pathophysiology, cancer, and cardiac and vascular pathology.

The department teaches an extensive course in the second year of the curriculum and presents a number of conferences that third- and fourth-year students can attend, plus offering a number of clerkships. The coursemaster of the second-year Pathology course is Erika C. Crouch, Ph.D., M.D. Students can take clerkships in Autopsy Pathology, Surgical Pathology and Laboratory Medicine, or participate in the research activities of the faculty (see Saffitz for guidance on these).

The Section of Immunology integrates immunology activities in the School. It is responsible for the teaching of immunology in the first year of the curriculum (Andrey S. Shaw, M.D., is the course-master), and in conducting basic research in immunology and in the immunological basis of disease.

Many faculty in the department are involved in graduate teaching and participate in the various programs offered by the Division of Biology and Biomedical Sciences. The department has strong participation in the Immunology Graduate Program, which is headed by Paul M. Allen, Ph.D.

## **Courses**

### ***First Year***

#### **M30 523 IMMUNOLOGY**

Instructors: Andrey S. Shaw, M.D., 362-4614; Emil R. Unanue, M.D., 362-7440; John P. Atkinson, M.D., 362-8391; Robert D. Schreiber, Ph.D., 362-8748; Barry P. Sleckman, M.D., Ph.D., 747-8235; Herbert W. Virgin IV, M.D., Ph.D., 362-9223

This course consists of laboratories, laboratory exercises and small group discussions. It covers all aspects of the immune response—general properties of the immune system, immunologic effector mechanisms and the role of immunology in disease. The Immunology course requires a strong background in biochemistry, genetics and cell biology. Some of the basic concepts from these fields should be reviewed during the course. There are two laboratory exercises that consist of POPS (Patient Oriented Problem-Solving System in Immunology). The POPS consist of workbooks that contain a clinical problem that is analyzed and solved during the session. There are five hours of small group discussions. In these sessions, students meet with physicians to discuss the role of immunology and a particular human disease. Basic Immunology: Functions and Disorders of the Immune System by Abbas and Lichtman is used. For the small group discussion, the latest edition of the textbook Case Studies in Immunology: A Clinical Companion (third edition) by Rosen and Geha will be used. There will be two exams consisting of multiple choice and true and false questions on the topics described in the lectures and in the laboratory sessions. This course is restricted to medical students only.

### ***Second Year***

#### **M60 665 PATHOLOGY**

Instructor: Erika C. Crouch, Ph.D., M.D., 454-8462

This course provides a comprehensive survey of the biology and morphology of human disease through a combination of lectures and laboratory sessions. The year begins with a review of basic disease mechanisms at the cellular and molecular level. Subsequently, the pathogenesis and characteristics of important diseases involving each organ system of the body are presented. During the year, students will become familiar with the methods of contemporary pathologic analysis. They also will learn how the results of pathologic studies are used in the clinical setting to establish diagnoses, to assess prognosis and response to therapy, and to evaluate the quality of patient care.

### ***Third Year***

#### **Conferences**

##### **Clinical Pathological Conference**

The clinical history and treatment of patients who have died are discussed before the class by the physicians and surgeons of the departments concerned. These conferences afford students an opportunity to interpret the clinical observations in light of the postmortem findings. One hour per week during the year. Staff

##### **Tumor Conference**

One hour each week for 12 weeks during the Surgery and Obstetrics and Gynecology clerkships. Problem cases are presented for illustration and discussion of all aspects of neoplastic disease. Staff

### ***Fourth Year***

#### **Electives**

#### M60 805 AUTOPSY PATHOLOGY

Instructor(s): Jeffrey Saffitz, M.D., Ph.D., and staff, 362-7728

Location: West Building

Elective Contact: Jeffrey Saffitz, M.D., Ph.D., 362-7728

Other Information: Students should contact Dr. Saffitz prior to scheduling this elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 13, 17, 21, 25, 29, 33, 37, and 41.

A full-time elective. Students will assist in performing autopsies and participate fully in Autopsy Service activities with the first-year house staff under the direction of senior pathology faculty.

Students will be encouraged to learn as much gross pathology as possible, and will participate in brain cutting, specialty microscopic conferences and weekly autopsy case conferences.

Student time distribution: Autopsy Activities 75%, Conferences/Lectures 25%

Major teaching responsibility: Attendings and house staff

Patients seen/weekly: N/A

On call/weekend responsibility: None

#### M60 815 OB-GYN PATHOLOGY SUBINTERNSHIP

Instructor(s): Phylliss Huettner, M.D., 362-0118

Location: Barnes-Jewish Hospital, South Campus

Elective Contact: Phylliss Huettner, M.D., 362-0118

Other Information: Students report to Dr. Huettner's office, 300S Peters Building, Barnes-Jewish Hospital, South Campus, 9:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The elective stresses the principles of anatomic pathology when applied to operative material in obstetrics and gynecology. The subintern will examine gross and microscopic specimens in the Ob-Gyn Pathology Lab and review pertinent literature with a senior pathologist. Ample time will be available for attending regular conferences in ob-gyn and pathology.

Student time distribution: Inpatient 90%, Conferences/Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attendings and residents

Patients seen/weekly: N/A

On call/weekend responsibility: In rotation

#### M60 820 SURGICAL PATHOLOGY -- BARNES-JEWISH HOSPITAL

Instructor(s): D. Ashley Hill, M.D., and surgical pathology staff, 454-8854, hill@path.wustl.edu

Location: N/A

Elective Contact: D. Ashley Hill, M.D., 454-8854

Other Information: Student should contact instructor prior to first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Surgical pathology offers an elective for a four-week period under Surgical Pathology I. Students participate fully in activities of the Division of Surgical Pathology, and they are responsible for dissection and description of gross specimens and microscopic diagnosis under supervision of the senior staff of the division. Students attend morning conferences with the faculty, surgical and medical grand rounds, and a variety of subspecialty conferences in which the division participates. In addition, Surgical Pathology II includes rotations through selected subspecialties: neuropathology, hematopathology, dermatopathology, ENT pathology, and gynecologic pathology. Dr. Hill and staff.

Student time distribution: Outpatient 80%, Conferences/Lectures 20%; Subspecialty Care 100%

Major teaching responsibility: Attendings and fellows

Patients seen/weekly: N/A

On call/weekend responsibility: None

#### M60 825 INTRODUCTION TO NEUROPATHOLOGY

Instructor(s): Robert E. Schmidt, M.D., Ph.D., 362-7426

Location: West Building

Elective Contact: Robert E. Schmidt, M.D., Ph.D., 362-7426

Other Information: Students report to 3720 Neuropathology, West Building, 9:00 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 13, 17, 21, 29, 33, 37, and 41.

The course is structured to give the student a full-time immersion in the specialty of neuropathology. There are daily didactic sessions that cover the spectrum of neurological diseases, review neuro-anatomy, discuss approaches to the diagnosis of nervous system disease, and point out the interrelationships of research to clinical problems. Multiple clinical conferences and diagnostic working sessions complement the reading and project work. Time: 35 to 40 hours per week.

Student time distribution: Conferences/Lectures 100%; Subspecialty Care 100%

Major teaching responsibility: Attendings and fellows

Patients seen/weekly: N/A

On call/weekend responsibility: None

#### M60 841 PEDIATRIC PATHOLOGY

Instructor(s): Frances V. White, M.D., 362-0101

Location: Barnes-Jewish Hospital, South Campus

Elective Contact: Frances V. White, M.D., 362-0101

Other Information: By arrangement only (call Dr. White). Students report to Dr. White's office, 3rd Floor, Peters Building, Barnes-Jewish Hospital, South Campus, 9:00 a.m. first day of elective.

Enrollment limit per period: N/A

Valid start weeks for this rotation should be arranged with Dr. White.

This four-week elective offers an experience in pediatric pathology involving material from both the Pediatric Autopsy Service and the Division of Surgical Pathology based on cases from St. Louis Children's Hospital and Barnes-Jewish Hospital. In Surgical Pathology, students will have the opportunity to review current cases with senior staff. They will assist residents on the Pediatric Autopsy Service with gross and microscopic diagnosis under supervision of senior staff. Conferences, slide review and possible independent research projects are included.

Student time distribution: Lab work 75%, Conferences/Lectures 25%; Subspecialty Care 100%

Major teaching responsibility: Single attending and fellow

Patients seen/weekly: N/A

On call/weekend responsibility: None

#### M60 850 SURGICAL PATHOLOGY -- BARNES-JEWISH HOSPITAL

Instructor(s): Jon Ritter, M.D., and staff, 362-0104

Location: Barnes-Jewish Hospital, South Campus

Elective Contact: Jon Ritter, M.D., 362-0104

Other Information: Students report to 2457, Barnes-Jewish Hospital Department of Pathology, first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This elective is designed to acquaint the students with the discipline of surgical pathology and to permit them to develop basic skills in histopathological interpretation. This elective will be offered to only one student per period in order to permit maximum interaction with the surgical pathology staff and house staff. During the course of the elective, the student will be taught to function as junior house staff. The student will participate in the examination and dissection of gross specimens, observe frozen section diagnosis, and formulate histopathological diagnoses, all in conjunction with residents and members of the senior staff. Since the Laboratory of Surgical Pathology at Barnes-Jewish Hospital processes a broad range of medical biopsy material as well as specimens derived from busy surgical subspecialty practice, the elective is considered desirable for students who plan careers in internal medicine, surgery, and radiology as well as for those who intend to enter the field of pathology.

Student time distribution: Clinical 85%, Conferences/Lectures 15%; Subspecialty Care 100%

Major teaching responsibility: Attendings and senior fellows

Patients seen/weekly: N/A

On call/weekend responsibility: None

#### M60 860 CLINICAL LABORATORY MEDICINE -- BARNES-JEWISH HOSPITAL

Instructor(s): Charles Eby, M.D., 362-3186

Location: Barnes-Jewish Hospital, South Campus

Elective Contact: Jenny Adams, 362-3110

Other Information: Students meet in chief resident's office, 2nd Floor Barnes-Jewish Hospital, South Service Building, 8:30 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: 13, 17, 21, 29 and 33.

This elective is designed to teach the student how the vast array of clinical assays are used in the diagnosis of disease and how the tests are actually performed in the clinical laboratory. The four-week elective includes rotations through laboratories in clinical chemistry, clinical microbiology, hematology, coagulation, and blood bank. During the elective the student will have a carefully planned daily schedule, which includes regular didactic sessions with senior staff and house staff. Particularly useful clinical skills to be acquired include analysis of peripheral blood smears and coagulation tests, interpretation of cardiac enzyme and serum protein electrophoresis patterns, appropriate use of blood component therapy, and indications for therapeutic apheresis. Students will be given the opportunity to present and lead case discussions during this elective.

Student time distribution: Inpatient 25%, Conferences/Lectures 75%; Primary Care 20%, Subspecialty Care 80%

Major teaching responsibility: Attendings and residents

Patients seen/weekly: Less than 1

On call/weekend responsibility: None

#### M25 883 TRANSFUSION MEDICINE

Instructor(s): Lawrence Tim Goodnough, M.D., 362-1546

Location: Barnes-Jewish Hospital

Elective Contact: Donna Sprinkle, 362-3186

Other Information: Students should preschedule their rotation with Dr. Goodnough. Students should meet Dr. Goodnough on the 2nd floor of Barnes Service Building, first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This elective is designed to introduce the student to the clinical aspects of blood banking and interventional hematology. The four-week elective will consist of regular didactic sessions with senior staff, teaching conferences, participation in daily clinical rounds and exposure to developing programs. The student will develop clinical skills in areas related to transfusion practice, blood conservation and evaluation of transfusion reactions. Complex hematologic diseases such as the coagulopathies and diseases that require apheresis will serve to instruct in current clinical practice along with evolving applications of interventional hematology, such as photopheresis and peripheral stem cell harvest for marrow transplantation.

Student time distribution: For July, November, and March: Inpatient 50%, Conferences/Lectures 50%; For remainder of year: Inpatient 100%; Subspecialty Care 100%

Major teaching responsibility: Attendings

Patients seen/weekly: 20-25

On call/weekend responsibility: Optional

In addition to the above, the department offers several advanced courses in the Division of Biology and Biomedical Sciences. These courses are listed below, but are described in the offerings of the Division of Biology and Biomedical Sciences.

L41 (Bio) 5051 FOUNDATIONS IN IMMUNOLOGY

L41 (Bio) 5171 MEDICAL IMMUNOLOGY

L41 (Bio) 5261 MOLECULAR MECHANISMS OF DISEASE

L41 (Bio) 5272 ADVANCED TOPICS IN MOLECULAR IMMUNOLOGY

Note — The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences.

## Research

### (M60 900)

Paul M. Allen, Ph.D., 7th Floor Clinical Sciences Research Building, 362-8758. Research in immunology. The recognition of antigen by T cells. We are investigating how the T cell receptor functions developmentally, biochemically and structurally. We utilize in vivo models to study alloreactivity/graft rejection and the pathophysiological mechanisms involved in rheumatoid arthritis.

Jacques U. Baenziger, M.D., Ph.D., 7th Floor Clinical Sciences Research Building, 362-8730. Glycobiology, informational role of carbohydrates in protein targeting and reproductive endocrinology.

Erika C. Crouch, M.D., Ph.D., 454-8462. The structure and function of collagenous carbohydrate bindings' proteins known as collectins. We are actively investigating the structure, function, synthesis, assembly and secretion of SP-D—a lung surfactant associated collectin that contributes to the innate pulmonary host defense against a wide variety of important bacterial, fungal, and viral pathogens. The laboratory is studying the human SP-D promoter and using site-directed mutagenesis to examine the structural requirements for assembly, secretion and biologic activity.

Jack Ladenson, Ph.D., 216 S. Kingshighway, Room 2423, 454-8436. Development and use of monoclonal antibodies including single-chain antibodies and antibody libraries.

Michael McDaniel, Ph.D., 3709 West Building, 362-7435. A major focus of this laboratory is to elucidate the cellular mechanisms responsible for destruction of the pancreatic b-cell associated with Type I diabetes mellitus, with emphasis on proinflammatory cytokines, the free radical nitric oxide and possible therapeutic interventions in acute, chronic and immunologically mediated inflammation. An additional focus is to identify specific signal transduction pathways that mediate abnormal insulin secretory responses by b-cells associated with Type II diabetes mellitus and to identify the mitogenic signaling pathways in growth factor and nutrient-mediated b-cell growth. An understanding of the role of the mTOR signaling pathway to initiate protein translation, cell cycle progression and cell proliferation will provide important new insights to enhance the ability of growth factors and nutrients to stimulate b-cell growth. Current projects involve molecular and biochemical approaches to study either focus area.

Daniel W. McKeel, Jr., M.D., 4713 West Building, 362-7421. This laboratory is investigating the pathogenesis and neuropathology of Alzheimer's and other dementias in relation to normal aging. There is close collaboration with the Memory and Aging Project (MAP) research team and the Laboratory of Neuroimaging (LONI). Emphasis is on mapping the distribution and severity of early lesions and the derivation of neuritic plaques and neurofibrillary tangles, and defining their relationship to cerebrovascular amyloid and cytoskeletal components.

Current research focuses on developing silver stains and immunochemical probes to assist computer imaging and quantification of plaques, tangles and neurons. Projects include: (1) lesion quantification in brains of the very aged (over 80 years); (2) correlation of lesion severity with precise clinical measurements of cognitive deficits; (3) interactive and automated computer-assisted quantification of neuritic plaque subtypes; and (4) a multicenter study (CERAD) to validate pathologic criteria for diagnosing Alzheimer's disease.

Jeffrey D. Milbrandt, M.D., Ph.D., 101 Biotechnology Center, 362-4650. We have several ongoing projects in our laboratory. (1) The biological function of the GFL family of neurotrophic factors (GDNF, neurturin, persephin and artemin) that signal through a receptor complex containing the Ret tyrosine kinase. These factors promote survival of multiple neuronal populations including dopaminergic neurons, which degenerate in Parkinson's disease, motor neurons, which are affected in Lou Gehrig's disease and most neurons of the peripheral nervous system. (2) The biological roles of Egr2/Nab2 in regulating the Schwann cell myelination program and how abnormal function of these transcription factors result in peripheral neuropathies. (3) The development of prostate cancer, especially the role of Egr1 in regulating the PIN to invasive carcinoma transition and the role of the Nkx3.1 homeodomain protein in tumor initiation.

Curtis A. Parvin, Ph.D., 2435 Barnes-Jewish Hospital, North Campus, 454-8436. The application of biostatistical theory to data analysis issues in laboratory medicine, with particular emphasis on statistical approaches to characterizing the performance and quality of laboratory tests.

Jeffrey E. Saffitz, M.D., Ph.D., 4715 West Building, 362-7728. Experimental cardiovascular pathology research. Areas of research: cellular and molecular mechanisms of sudden cardiac death and the

biology and pathobiology of intercellular communication in the heart.

Robert E. Schmidt, M.D., Ph.D., 3rd Floor West Building, 362-7429. Areas of research interest in this laboratory include: (1) the development and characterization of an experimental model of diabetic autonomic neuropathy in streptozotocin diabetic rats; (2) human sympathetic nervous system in aging and diabetes; (3) susceptibility of subpopulations of sympathetic neurons to experimental injury; (4) the role of oxidative stress in the pathogenesis of experimental diabetic autonomic and age-related neuropathy.

Robert D. Schreiber, Ph.D., 7749 Clinical Sciences Research Building, 362-8747. Tumor Immunology and Cancer Immunoediting. Research on cytokine signal transduction and definition of the molecular roles of interferon-gamma, tumor necrosis factor and interleukin-10 in promoting host responses to tumors and microbial pathogens.

Andrey S. Shaw, M.D., 7721 Clinical Sciences Research Building, 362-4614. Signal transduction in lymphocytes. Genetic basis of renal disease.

Barry Sleckman, M.D., Ph.D., 1747 West Building, 747-8235. Cellular immunology; molecular basis of T cell receptor assembly.

Carl H. Smith, M.D., St. Louis Children's Hospital, 454-6029. Placental transport and surface membrane structure and function.

Steven Teitelbaum, M.D., Barnes-Jewish Hospital, 454-8463. Cellular and molecular mechanisms of bone remodeling with particular emphasis on osteoclast biology as relates to pathogenesis and prevention of diseases, such as osteoporosis. We focus on integrin and cytokine biology utilizing a variety of genetically-manipulated mice.

John Turk, M.D., Ph.D., 6609 Wohl, 362-8190. Studies focus on the role of phospholipase A2 (PLA2) enzymes in the regulation of insulin secretion from pancreatic islet beta cells. A novel PLA2 that does not require calcium ions has been cloned from rat and human islets that appears to participate in beta cell secretion and proliferation. Further studies of the role of this enzyme in these processes, its post translational modifications, and its interactions with other proteins involve molecular biologic manipulation of expression of the enzyme in cultured beta cells and intact mice. Mass Spectrometric characterization of complex lipids and proteins is an important tool in these studies.

Emil R. Unanue, M.D., 3701 West Building, 362-7440. Research in immunobiology/immunopathology. Examination of cellular interactions resulting in immune induction and cellular immunity. These cellular interactions are being studied in normal, in infectious processes, and in autoimmune diseases. The focus is to identify the proteins responsible for activation of lymphocytes in type I diabetes as well as in infection with the intracellular pathogen *Listeria monocytogenes*.

Herbert Virgin, M.D., Ph.D., 1754 West Building, 362-9223. We work on issues at the interface of virology and immunology by analyzing aspects of viral immunity, viral pathogenesis, and viral genetics that contribute to virulence and disease. We focus on latency and pathogenesis of herpes viruses.

Mark A. Watson, M.D., Barnes-Jewish Hospital, Room 2316 Kingshighway Building, 454-7919. Our laboratory is interested in defining gene transcriptional programs associated with the early progression of human breast cancer. The experimental approach utilizes histopathological review and laser capture microdissection of tumor tissue from patient biopsies coupled with state-of-the-art quantitative RT-PCR, DNA expression microarray, and tissue microarray technologies. Using bioinformatics and statistical analysis of microarray data, we are defining gene expression profiles associated with breast tumor progression, from cellular atypia to invasive disease. Individual genes and signaling pathways identified will be used to better understand the biology of breast cancer, to identify novel diagnostic markers, and to develop strategies for new, targeted therapies. Similar approaches using DNA microarrays and bioinformatics are being applied to molecularly classify several other types of inherited and sporadic solid tumor neoplasms.

## Faculty

**EMIL RAPHAEL UNANUE, MD** Mallinckrodt Professor of Pathology and Immunology, Head of The Department of Pathology



and Immunology

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**YVONNE LANDT** Research Instructor in Pathology and Immunology

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**DEBORAH J NOVACK, MD, PHD** Assistant Professor of Pathology and Immunology

**JOHN WILLIAM OLNEY, MD** Professor of Pathology and Immunology (Neuropathology)

**CURTIS ALAN PARVIN, PHD** Clinical Research Associate Professor of Pathology and Immunology

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**LOURDES YLAGAN, MD** Assistant Professor of Pathology and Immunology  
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**BARBARA ANN ZEHNBAUER, PHD** Associate Professor of Pathology and Immunology  
**LIJUAN ZHANG, PHD** Assistant Professor of Pathology and Immunology  
**XIANFENG ZHAO** Assistant Professor of Pathology and Immunology (Pending Executive Faculty Approval)  
**MARY M ZUTTER, MD** Professor of Pathology and Immunology

## Department's Website

<http://www.pathology.wustl.edu/>

## Department of Pediatrics

The primary aim of the teaching program of the Department of Pediatrics is to stimulate interest in developmental biology, especially human growth and development, and to provide the student with a foundation sufficiently comprehensive so that he or she will have an appreciation of clinical pediatric problems regardless of his or her future career choice in medicine.

The major clinical and research facilities are in St. Louis Children's Hospital and the newborn services are at Barnes-Jewish Hospital. St. Louis Children's Hospital is a facility with 235 beds that accepts patients through 21 years of age with all types of medical and surgical problems. Hospital admissions average 11,000 annually. Pediatric medical ambulatory activity, including subspecialty and emergency visits, averages about 90,000 visits a year. Nearly 5,000 infants are born annually in the Medical Center.

## Courses

### ***First Year***

#### M30 511 MEDICAL GENETICS

Instructors: Jeffrey I. Gordon, M.D., 362-7243;

Alison J. Whelan, M.D., 362-7800

The course is divided into halves. The first half focuses on the mechanisms of regulation of gene expression in eukaryotes. This includes discussions of the structure of DNA and its means of replication, the organization and packaging of eukaryotic genomes, chromatin structure and the nucleosome, the organization of polymerase II class genes, the processing of their primary transcripts, and the molecular basis for transcriptional and translational regulation including the use of transgenic mice to study cell-specific gene regulation. The second half focuses on how these concepts can be applied to an understanding of medical genetics. Topics covered include principles of Mendelian genetics, the molecular basis for various inborn errors of metabolism, their diagnosis and prenatal screening, the genetics of cancer, and finally, current strategies for mapping and characterizing the

human genome. This course is referenced in Department of Genetics and is cross-listed with L41 (Bio) 550.

## **Selectives**

M04 526 NEW DISEASES, NEW PATHOGENS

For full description, see Department of Molecular Microbiology.

## **Second Year**

Students are introduced to pediatrics and to the faculty through a series of lectures and symposia designed to acquaint them with the concepts of human growth and development and the effects of age and maturity on reactions to injury and disease. The unique aspects of the physical examination of the infant and child are presented in the Introduction to Clinical Medicine course. Members of the faculty are active participants in the second-year Pathophysiology course.

## **Third Year**

M65 760 PEDIATRIC CLERKSHIP

Instructors: Kathleen A. McGann, M.D.; Angela M. Sharkey, M.D. (both: 454-6299)

This six-week curriculum, which is a component

of the 12-week Women's and Children's Health Clerkship, emphasizes pediatric pathophysiology and normal growth and development from birth through adolescence. Two weeks will be spent assessing newborns in the regular or special care nurseries at Barnes-Jewish or Missouri Baptist hospitals or spent seeing patients in the pediatric emergency department. Four weeks will be spent at St. Louis Children's Hospital on an inpatient service. Emphasis is on performing a pediatric history and physical examination and developing an appropriate differential diagnosis. Daily rounds with house staff and attending physicians, as well as weekly case management conferences and grand rounds, further this emphasis. A weekly core lecture series also is offered during this 12-week combined clerkship (Women's and Children's Health) with Ob/Gyn.

## **Fourth Year**

### **Electives**

M65 801 GENERAL PEDIATRIC SUBINTERSHIP<sup>3/4</sup>ST. LOUIS CHILDREN'S HOSPITAL

Instructor(s): Kathleen McGann, M.D.; Angela Sharkey, M.D.; Alan Schwartz, M.D., Ph.D.; and Andrew White, M.D., 454-6299

Location: St. Louis Children's Hospital

Elective Contact: Pat Jacobi, 4S30 St. Louis Children's Hospital, 454-6299

Other Information: Students should call Pat Jacobi, 454-6299, one month before start date. Floor assignments will be determined by lottery from floor choices 7East, 9East and 12West. Students should report to their designated floor on their first day at 8:00 a.m.

Enrollment limit per period: 3

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This is the general pediatric subinternship. The student will be assigned patients on one of three inpatient pediatric floors (7East, 9East or 12West) for initial evaluation and continuing care. The student works as an extern and is expected to take call every fourth night. Students work directly under the supervision of the senior resident, and teaching rounds are conducted by the faculty. The elective will provide experience in the management of many pediatric medical conditions (variable depending on floor) including a wide variety of infectious diseases, failure to thrive, acute asthma, poisonings, immune deficiency diseases, along with pulmonary, gastrointestinal, renal and neurologic disorders.

Student time distribution: Inpatient 100%; Subspecialty Care/General Pediatrics 100%

Major teaching responsibility: Attendings and residents

Patients seen/weekly: 12

On call/weekend responsibility: Every fourth night

#### M65 808 PEDIATRIC ASTHMA AND ALLERGY

Instructor(s): Leonard B. Bacharier, M.D., and Robert C. Strunk, M.D., 454-2694

Location: 5S30 St. Louis Children's Hospital

Elective Contact: Suzanne Cipponeri, 454-2694

Other Information: Students should call 454-2694 prior to the start of this elective for location and time.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

In predominantly an outpatient setting, students will evaluate patients with a wide variety of allergic disorders including asthma, allergic rhinitis, anaphylaxis, food allergy, atopic dermatitis and urticaria/angioedema. Goals include: (1) the extension of history-taking skills to include environmental exposures, (2) the recognition of physical findings suggestive of allergic disease, (3) understanding the indications and interpretation of diagnostic testing including skin testing and assessment of pulmonary function, and (4) application of appropriate therapeutic strategies to these disorders. Weekly didactic conferences and inpatient consultations provide additional educational opportunities.

Student time distribution: Inpatient 20%, Outpatient 70%, Conferences/ Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Leonard B. Bacharier, M.D., and Robert C. Strunk, M.D.

Patients seen/weekly: 20

On call/weekend responsibility: None

#### M65 811 PEDIATRIC CRITICAL CARE MEDICINE

Instructor(s): J. Perez Fontan, M.D., 454-2527

Location: 5S20 St. Louis Children's Hospital

Elective Contact: J. Perez Fontan, M.D., 454-2527

Other Information: Students report to the PICU, 7th Floor St. Louis Children's Hospital, 8:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This elective is designed to familiarize the student with the diagnosis and treatment of critical illness in infants and children. To this end, each student is made responsible for a small number of assigned cases under the direct supervision of pediatric residents, pediatric critical care fellows, and faculty. The teaching activities emphasize the understanding of pathophysiological processes that lead to respiratory, cardiocirculatory, and central nervous system dysfunction and their therapy in the developing subject. Students are expected to participate in all the daily activities of the Pediatric Intensive Care Unit at St. Louis Children's Hospital and be on occasional call after hours.

Student time distribution: Inpatient 100%; Subspecialty Care 100%

Major teaching responsibility: Attending, critical care fellows, and pediatric residents

Patients seen/weekly: 150

On call/weekend responsibility: Yes

#### M65 813 PEDIATRIC CARDIAC CATHETERIZATION

Instructor(s): David Balzer, M.D., and Russel Hirsch, M.D., 454-6095

Location: St. Louis Children's Hospital

Elective Contact: David Balzer, M.D., 454-6095

Other Information: Student reports to 5S30 St. Louis Children's Hospital, 8:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Elective will focus on interpretation of hemodynamic and angiographic data acquired in the cardiac catheterization laboratory.

Student time distribution: Inpatient 50%, Outpatient 45%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Two attendings, supplemented by one fellow

Patients seen/weekly: 10

On call/weekend responsibility: None

#### M65 818 PEDIATRIC CARDIOLOGY -- INPATIENT SERVICE

Instructor(s): Angela Sharkey, M.D.; Charles E. Canter, M.D.; Mark Grady, M.D.; Mark Johnson, M.D.; and Dave Balzer, M.D., 454-6095

Location: St. Louis Children's Hospital

Elective Contact: Angela Sharkey, M.D., 454-6095

Other Information: Students report to 5S30 St. Louis Children's Hospital, Cardiology Division Office, 9:00 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The student works as a subintern and is assigned selected patients on the pediatric cardiology ward. Patients admitted to the cardiology service include those being evaluated for surgical intervention, patients with significant congestive heart failure, and those for cardiac catheterization/ intervention. The student has an opportunity to follow patients through these procedures.

Student time distribution: Inpatient 95%, Conferences/Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Single or two attendings, supplemented by one resident and one fellow

Patients seen/weekly: Up to 15

On call/weekend responsibility: As desired, none required

#### M65 819 PEDIATRIC CARDIOLOGY -- OUTPATIENT SERVICE

Instructor(s): Angela Sharkey, M.D.; Charles E. Canter, M.D.; Mark Grady, M.D.; Mark Johnson, M.D.; Dave Balzer, M.D.; Jill Ibrahim, M.D.; and Edward Rhee, M.D., 454-6095

Location: St. Louis Children's Hospital

Elective Contact: Angela Sharkey, M.D., 454-6095

Other Information: Students report to Heart Station, 2nd Floor St. Louis Children's Hospital, Cardiology Division Office, 9:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students will independently evaluate outpatients referred for evaluation of cardiac murmurs, chest pain, arrhythmia and report findings to the attending physician. Clinics are held at St. Louis Children's Hospital, Missouri Baptist Hospital, and many outreach sites. The student will review with the attending all ECGs, holter monitors, echocardiograms performed. Participation in weekly surgical conference and journal club is expected.

Student time distribution: Outpatient 95%, Conferences/Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Multiple attendings

Patients seen/weekly: 25

On call/weekend responsibility: None required

#### M65 825 CLINICAL GENETICS

Instructor(s): Rick A. Martin, M.D., 454-6093

Location: 4S30 St. Louis Children's Hospital

Elective Contact: Rick A. Martin, M.D., 454-6093

Other Information: Students report to 4S30 St. Louis Children's Hospital, 8:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The goal of the Senior Medical Student elective in Clinical Genetics is to familiarize the student with the role of the Clinical Geneticist and Genetic Counselor in the diagnosis and management of birth defects and genetic disease. Attainment of this goal will be accomplished by a myriad of clinical experiences through established weekly genetics clinics in the Department of Pediatrics, Medicine and Neurology and on the pediatric genetics inpatient consultation service at St. Louis Children's Hospital and Barnes-Jewish Hospital. The primary student role will be clinical evaluation of patients with various genetic diseases and syndromes under supervision of a clinical geneticist and/or a genetic counselor. Through this exposure the student will be expected to leave the elective not only with a more thorough understanding of basic genetic principles but also of the role of genetics in health care and the impact genetic disease has on the patient, their family and society.

Student time distribution: Inpatient 20%, Outpatient 70%, Conferences/ Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attendings

Patients seen/weekly: 15

On call/weekend responsibility: None

#### M65 827 SUBINTERNSHIP IN PEDIATRIC HEMATOLOGY/ONCOLOGY

Instructor(s): David Wilson, M.D., Ph.D., 454-2717

Location: St. Louis Children's Hospital, 9 West

Elective Contact: David Wilson, M.D., 286-2834

Other Information: Students report to 9 South Nursing Station, 8:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students will assume the responsibilities of a pediatric resident on the inpatient Hematology/Oncology service at St. Louis Children's Hospital.

Student time distribution: Inpatient 90%, Conferences/Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Single attending, first-year hem-onc fellow and junior resident

Patients seen/weekly: 2-3 patients a day

On call/weekend responsibility: Every 4 days with resident

#### M65 833 SPECIAL TOPICS IN REPRODUCTIVE HEALTH

Instructor(s): F. Sessions Cole, M.D., 454-6148

Location: 5S20 St. Louis Children's Hospital

Elective Contact: F. Sessions Cole, M.D., 454-6148

Other Information: Students meet at 5S20 St. Louis Children's Hospital, 8:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students will participate in clinical experiences in four clinical modules: contraception, sexually transmitted diseases, abortion and special topics (HIV infection and adolescence). Required reading will include relevant review articles. Clinical experiences will be primarily ambulatory.

Student time distribution: Outpatient 90%, Conferences/Lectures 10%; Primary Care 30%, Subspecialty Care 70%

Major teaching responsibility: Attendings

Patients seen/weekly: 10

On call/weekend responsibility: None

#### M65 835 PEDIATRIC IMMUNOLOGY AND RHEUMATOLOGY

Instructor(s): Andrew White, M.D.,

454-6124; Jonathan Gitlin, M.D.; Anthony French, M.D., Ph.D.; and Fei Shih, M.D., Ph.D.

Location: St. Louis Children's Hospital

Elective Contact: Andrew White, M.D., 454-6124

Other Information: Students report to Immunology/ Rheumatology Office, Suite C, St. Louis Children's Hospital, 8:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Opportunities are available to care for children with a variety of immunologic and rheumatologic disorders. Students will see patients in outpatient clinics and inpatient consultations. An in-depth approach to evaluating disorders of the immunologic system will be provided. Students will participate in evaluation of new patients with a variety of rheumatologic diseases including JRA, SLE and scleroderma at both SLCH and Shriners Hospital clinics. Students may elect to participate in conferences and seminars.

Student time distribution: Inpatient 20%, Outpatient 70%, Conferences/ Lectures 10%; Primary Care 30%, Subspecialty Care 70%

Major teaching responsibility: Andrew White, M.D.

Patients seen/weekly: 35-40

On call/weekend responsibility: None

#### M65 840 PEDIATRIC INFECTIOUS DISEASES

Instructor(s): Joseph W. St. Geme, M.D.; Greg Storch, M.D.; Kathleen McGann, M.D.; David Haslam, M.D.; Alexis Elward, M.D.; Galit Holzmman-Pazgal, M.D.; David Hunstad, M.D.; and Jeffrey McKinney, M.D., Ph.D., 454-6050

Location: St. Louis Children's Hospital

Elective Contact: Joseph W. St. Geme, M.D., 454-6050

Other Information: Student reports to 11W32 St. Louis Children's Hospital, 9:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This elective is designed to introduce students to the clinical aspects of infectious diseases in children. Students will consult on both inpatients and outpatients. Regular daily activities will include evaluation of new patients, work rounds on inpatient consults, microbiology teaching rounds in the bacteriology lab, and teaching rounds with the infectious disease attending. Formal teaching sessions include a weekly pediatric infectious disease case conference, a weekly joint clinical conference with the adult infectious disease group, a weekly pediatric infectious disease research conference and a monthly journal club.

Student time distribution: Inpatient 70%, Outpatient 20%, Conferences/ Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: One or two attendings, one or two fellows

Patients seen/weekly: 5-10 new patients primarily, over 20 new patients with team

On call/weekend responsibility: Saturdays optional

#### M65 841 CARE OF THE HIV-INFECTED PATIENT

Instructor(s): Kathleen McGann, M.D., 454-6050, Gregory Storch, M.D., and staff

Location: St. Louis Children's Hospital, Barnes-Jewish Hospital, plus other ambulatory sites.

Elective Contact: Kathleen McGann, M.D., 454-6050

Other Information: Students should contact Dr. McGann one week prior to the start of rotation.

Students report to 11W32 St. Louis Children's Hospital, 9:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This elective is designed to introduce students to the care of HIV-infected individuals (adults, adolescents, and children) and of HIV-exposed infants. Care of the HIV-infected patient encompasses not only the medical aspects, but also the psychosocial aspects of care. The elective will involve rotation through several clinics including the maternal-HIV clinic, pediatric and adolescent HIV clinics, and several adult HIV clinics, along with participation in community-wide social service meetings, home visits, and exposure to the Retrovirus laboratory and the AIDS Clinical Trials unit. In addition, the student will spend part of his/her time rotating in the general ambulatory infectious diseases clinics (pediatric and adult ID).

Student time distribution: Outpatient 65%, Conferences/Lectures 15%, Other 20%; Subspecialty Care 100%

Major teaching responsibility: Attendings listed above as course instructors

Patients seen/weekly: 20

On call/weekend responsibility: None

#### M65 845 PEDIATRIC EMERGENCY MEDICINE

Instructor(s): David M. Jaffe, M.D., 454-2341

Location: St. Louis Children's Hospital

Elective Contact: Carol Heller, 454-2341

Other Information: Students report to 4S50 St. Louis Children's Hospital, 8:30 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The goal of this elective is to provide the senior medical student with a broad introductory clinical



experience in pediatric emergency medicine. Functioning as a subintern in the Emergency Unit of St. Louis Children's Hospital, the student will have the opportunity to evaluate and manage patients with a wide variety of emergent and urgent medical and surgical problems. Examples include: respiratory distress, abdominal pain, lacerations, bone injuries, rashes, fever, etc.

Students will work either a day shift (7:30 a.m.-3:00 p.m.) or an evening shift (3:00 p.m.-11:00 p.m.) in rotation. Daily teaching conferences are provided by the attending staff. A weekly meeting of the students and senior faculty will occur to review interesting cases. Also, attending staff and senior pediatric residents provide 24-hour on-site supervision. Each medical student will be asked to prepare a 20-minute presentation on a topic of his/her choosing.

Student time distribution: Outpatient 90%, Conferences/Lectures 10%; Subspecialty Care (Emergency Medicine) 100%

Major teaching responsibility: All EM attendings

Patients seen/weekly: ~30

On call/weekend responsibility: None (unless making up time)

#### M65 850 PEDIATRIC ENDOCRINOLOGY AND METABOLISM

Instructor(s): Neil H. White, M.D.; Abby Hollander, M.D.; Bess Marshall, M.D.; Louis Muglia, M.D., Ph.D.; Rebecca Green, M.D., Ph.D.; and Paul Hruz, M.D., Ph.D.; 286-1157

Location: St. Louis Children's Hospital

Elective Contact: Richard Fair, 286-1157

Other Information: Student has the option to extend elective. Students report to Endocrinology/Metabolism Office, 11th Floor St. Louis Children's Hospital, 8:30 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This elective is designed to include broad clinical experience in pediatric endocrinology and diabetes. The student will have an opportunity to evaluate both patients admitted to St. Louis Children's Hospital and patients referred for consultation in our three outpatient clinics each week. In addition to a divisional conference to review referred patients, several joint conferences with the adult Endocrinology and Metabolism Division (clinical rounds, journal club/research seminar, case conference) are held weekly.

Student time distribution: Inpatient 40%, Outpatient 50%, Conferences/ Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attending physicians and fellows

Patients seen/weekly: 10-20 by student

On call/weekend responsibility: None

#### M65 851 CLINICAL PEDIATRIC GI ELECTIVE

Instructor(s): Robert Rothbaum, M.D., 454-6173

Location: Gastroenterology Clinical Offices, SLCH, Room 11E10

Elective Contact: : Debbie Long, 454-6173, long\_d@kids.wustl.edu

Other Information: Students should contact Debbie Long at least one week in advance of first day of elective for further information.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The rotation in Pediatric Gastroenterology, Hepatology, and Nutrition provides broad exposure to specialized and common pediatric problems. Gastroenterology patients are seen in both the outpatient suites and in the hospital. Students see outpatients with common pediatric complaints like chronic abdominal pain, constipation, and poor growth. Additionally, students experience the ongoing outpatient care of patients with chronic liver disease, inflammatory bowel disease, short-gut syndrome, celiac disease and other rare disorders. The inpatient service provides experience in caring for patients with acute illnesses such as gastrointestinal bleeding, malnutrition, liver failure, complications of inflammatory bowel disease, and pancreatitis. Students participate in diagnostic and therapeutic endoscopic procedures. At weekly divisional conferences, attendings, fellows and students review pathology slides from current cases and discuss difficult patient problems and topics of interest.

Student time distribution: The time spent in the outpatient clinic and on the inpatient service is individualized according to the student's interests. In general, the distribution is: Inpatient 50%,

Outpatient 45%, Conferences/Lectures 5%; Subspecialty Care 100%  
Major teaching responsibility: Attendings and fellows  
Patients seen/weekly: 130  
On call/weekend responsibility: None

#### M65 852 CLINICAL PEDIATRIC PULMONARY MEDICINE

Instructor(s): Robert C. Strunk, M.D.; Leonard Bacharier, M.D.; Maite De La Morena, M.D.; Thomas Ferkol, Jr., M.D.; Pamela Schuler, M.D.; Steven D. Shapiro, M.D.; Stuart C. Sweet, M.D.; and Elizabeth Uong, M.D., 454-2694  
Location: 5S30 St. Louis Children's Hospital  
Elective Contact: Suzanne Cipponeri, 454-4088  
Other Information: Students meet 10th Floor Spoehrer Tower, 9:00 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This elective provides an opportunity for students to be exposed to the full scope of respiratory diseases in infants and children. Pediatric referrals will be seen in both an inpatient and outpatient setting. Goals include: (1) to learn the importance of the physical exam using inspection, percussion and auscultation; (2) indications and interpretation of diagnostic tests, such as CXR, chest CT, VQ scan, pulmonary function testing, and bronchoscopy with biopsy and lavage; (3) therapeutic interventions and the use of bronchodilators, anti-inflammatory agents, et. al. Unique aspects of this rotation include a broad exposure to children with congenital lung defects, life-threatening asthma, cystic fibrosis and end-stage cardiopulmonary diseases referred for transplantation. Weekly didactic sessions as well as weekly divisional patient care sections are an opportunity to further learn and practice presentational skills.

Student time distribution: Inpatient varies, Outpatient varies, Conferences/Lectures 10%; Primary Care 10%, Subspecialty Care 90%

Major teaching responsibility: Attendings

Patients seen/weekly: 25

On call/weekend responsibility: None

#### M65 861 NEWBORN MEDICINE

Instructor(s): F. Sessions Cole, M.D., 454-6148

Location: St. Louis Children's Hospital

Elective Contact: F. Sessions Cole, M.D., 454-6148

Other Information: Students should report to Dr. Cole's office by appointment the afternoon (or the Friday) prior to the beginning of the rotation for orientation.

Enrollment limit per period: 3

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The goal of this course is to provide students with responsibility for caring for newborn infants who range from normal to acutely ill to chronically ill and for their families. The physiology of the transition from fetal to extrauterine existence, the pathophysiology of specific diseases, and primary accountability of the student for patient management decisions and procedures will be emphasized. In addition, collaboration with nursing staff and other health care providers in decision-making (especially concerning the viability of individual infants) and family management will be regularly required.

Students during each rotation will have the option to rotate through the Neonatal Intensive Care Unit at St. Louis Children's Hospital and/or the labor and delivery services at Barnes-Jewish Hospital. Students assigned to the Neonatal Intensive Care Unit at St. Louis Children's Hospital also will have the opportunity to become involved in the transport of acutely ill infants, while those on the Labor and Delivery Service will routinely be involved in normal newborn care and delivery room management. The student will be expected to rotate patient responsibilities every fourth night.

Student time distribution: Inpatient 90%, Outpatient 5%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Attending, fellow, and residents

Patients seen/weekly: 30

On call/weekend responsibility: Every fourth night

#### M65 875 PEDIATRIC RENAL DISEASE

Instructor(s): Keith A. Hruska, M.D.; Anne M. Beck, M.D.; and S. Paul Hmiel, M.D., Ph.D., 454-6043

Location: St. Louis Children's Hospital

Elective Contact: Keith A. Hruska, M.D., 454-6043

Other Information: Students report to Lynne Strain, 454-2261, 11W32, St. Louis Children's Hospital, 9:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This course is designed to provide the student with a wide exposure to all aspects of pediatric renal disease and an opportunity to explore a desired aspect of the field in-depth. The student will be an integral part of the Renal Team and as such will see both inpatients and outpatients. Students will have an opportunity to follow the courses of patients with acute renal disease as well as those with more chronic problems and will help to plan the evaluation and therapeutic management of these patients. Discussions and rounds with the attending staff and fellows emphasize the relationship between clinical problems and the pathophysiology of the underlying disease. These informal teaching sessions are supplemented by more formal sessions. These include renal attending rounds, renal research rounds and grand rounds, which are conducted weekly in conjunction with the Renal Division of Barnes-Jewish Hospital. Renal biopsy material is reviewed with the renal pathologists. Attendance at the weekly pediatric grand rounds and pediatric case conferences is encouraged. Opportunities in clinical and translational research projects will be discussed with interested students.

Student time distribution: Inpatient 30%, Outpatient 60%, Conferences/ Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attendings

Patients seen/weekly: 12-15

On call/weekend responsibility: None

#### M65 876 PEDIATRIC LUNG TRANSPLANTATION

Instructor(s): Stuart C. Sweet, M.D., and Maite de la Morena, M.D., 454-2694

Location: Allergy/Pulmonary Medicine Office, 5S30 St. Louis Children's Hospital

Elective Contact: Suzanne Cipponeri, 454-4088

Other Information: Students meet in the Allergy/Pulmonary Office, 9:00 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

St. Louis Children's Hospital has the largest pediatric lung transplant program in North America. This unique clinical rotation will enable students to be exposed to the process of transplantation from referral and listing to the actual surgery and post-operative care. Both inpatient and twice weekly outpatient clinics will be available for participation and learning. The use of diagnostic tests, such as flexible fiberoptic bronchoscopy with biopsies, the histopathology of infection and graft rejection, and the complexities of immunosuppression will all be explored. Weekly transplant meetings with our multidisciplinary team, as well as didactic/psychosocial and ethical and divisional care meetings will all be available. Our patient referral base is worldwide, and the primary cardiopulmonary disease states include: cystic fibrosis, pulmonary hypertension, complex congenital heart defects and alveolar proteinosis.

Student time distribution: Inpatient 50%, Outpatient 40%, Conferences/ Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attendings

Patients seen/weekly: 20-30

On call/weekend responsibility: None

#### M65 878 CLERKSHIP IN RURAL PRIMARY CARE PEDIATRICS

Instructor(s): Angela Sharkey, M.D.; Kathleen McGann, M.D. -- Site Instructors: Kevin Blanton, M.D., in Sikeston and Claudia Preuschoff, M.D., in Poplar Bluff

Location: Sikeston or Poplar Bluff, MO

Elective Contact: Pat Jacobi, 4S30 St. Louis Children's Hospital, 454-6299

Other Information: Students should call Pat Jacobi, 454-6299, at beginning of school year to indicate which rotation (Sikeston or Poplar Bluff) they have chosen, complete additional paperwork, and make housing reservations. Students should then report to their chosen site on their first day at 7:30 a.m.

Enrollment limit per period: 1 per site

Valid start weeks for 2-week blocks are: Weeks 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, and 43.

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The clerkship in rural primary care pediatrics is designed to provide the student with first-hand experience in general pediatric practice in a rural community setting. Students will have the opportunity to see patients in a private office, participate in delivery room resuscitation, evaluate patients in the emergency department and provide pediatric consultation to family practitioners, obstetricians and surgeons. The objective of this elective is to provide the student with the experience of serving as a general pediatrician providing comprehensive health services in a rural community. Students assume responsibility for ongoing care of patients and have opportunities to perform procedures. Housing is available through SEMA ADHEC/Southeast Missouri Health Network at no cost to the student, however, reservations must be made early. Two-week or four-week blocks are available.

Student time distribution: Inpatient 10%, Outpatient 90%; Primary Care 100%

Major teaching responsibility: Single attending

Patients seen/weekly: 25-50

On call/weekend responsibility: Call with instructor, not in-house call

#### M25 831 PEDIATRIC DERMATOLOGY

Instructor(s): Susan Mallory, M.D., 454-2714

Location: 3N48 Children's Hospital

Elective Contact: Rosemarie Brannan, 454-8622

Other Information: Call 454-2714 prior to first day of elective. Reporting time is 7:45 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This clinical rotation will be available to students interested in dermatology, pediatrics or both. Students will follow the dermatology rotation (M25 830) with an emphasis on pediatric dermatology by attending pediatric dermatology clinics, seeing consults, etc. Enthusiastic students will have an opportunity to write up a case report if they wish, but need to notify Dr. Mallory before the course. Students can take either this elective or M25 830--not both.

Student time distribution: Inpatient 1%, Outpatient 74%, Conferences/ Lectures 25%; Subspecialty Care 100%

Major teaching responsibility: Single attending

Patients seen/weekly: 50-100

On call/weekend responsibility: None

#### M80 870 CLERKSHIP IN PRIMARY CARE IN GENERAL PEDIATRICS

Instructor(s): Paul Simons, M.D., and Jay Epstein, M.D., 535-7855

Location: Forest Park Pediatrics, 4488 Forest Park Blvd.

Elective Contact: Paul Simons, M.D., 535-7855

Other Information: Students should contact course master prior to the first day of the elective.

Reporting time is 9:00 a.m.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The Clerkship in Primary Care in General Pediatrics is designed to provide the student with first-hand experience in general pediatric practice in a model ambulatory care setting at the Forest Park Pediatrics office on the medical campus. The major component of the clerkship is direct patient care under the supervision of the senior physicians who are members of the group.

Students will join individual pediatricians as colleagues caring for pediatric patients under supervision. The broad spectrum of general ambulatory pediatrics including behavioral pediatrics, developmental pediatrics, preventive medicine and acute care aspects of pediatric practice will be emphasized. The objective of this elective is to provide the student with the actual experience of serving as a general pediatrician providing comprehensive health services to the families of a typical broadly based population receiving care through different insurance systems.

Student time distribution: Outpatient 95%, Conferences/Lectures 5%; Primary Care 80%, Subspecialty Care (Developmental Pediatrics) 20%

Major teaching responsibility: Attendings  
Patients seen/weekly: 50+  
On call/weekend responsibility: None

## Research

### **(M65 900)**

Charles E. Canter, M.D., 5S30 St. Louis Children's Hospital, 454-6095. Clinical studies on cardiac transplantation in infants and children.

F. Sessions Cole, M.D., 5S20 St. Louis Children's Hospital, 454-6148. Using population-based data bases, investigation priorities include: (1) impact of surfactant replacement therapy on racial disparities in infant mortality; and (2) understanding molecular epidemiology of surfactant protein B deficiency.

Michael R. DeBaun, M.D., M.P.H., 454-4177. Dr. DeBaun's research interests include: (1) clinical investigation of the natural history of stroke in sickle cell disease; and (2) genotype/phenotype analysis in pediatric syndromes associated with cancer.

Thomas G. Diacovo, M.D., 4th Floor McDonnell Pediatric Research Building, 286-2852. Vascular biology and immunology. Investigative efforts are aimed at dissecting the adhesive interactions responsible for recruiting platelets and leukocytes to sites of inflammation and vascular trauma. Our laboratory is using molecular and biochemical approaches to modify the expression of cell surface adhesion receptors (selectins and integrins). Several animal models are available to study the role of adhesion receptors using intravital microscopy.

Brian Hackett, M.D., Ph.D., 1146 St. Louis Children's Hospital, 286-2833. Molecular biology of lung development. Research will focus on the molecular regulation of pulmonary epithelial differentiation. Areas of interest include the use of molecular markers for all lineage analysis and the role of Forkhead transcription factors in pulmonary epithelial differentiation.

David B. Haslam, M.D., Room 6107 McDonnell Pediatric Research Building, 286-2888. Mechanisms of disease caused by bacterial toxins. Research focuses on the binding and intracellular transport of shiga toxins within human cells. An area of particular interest is the genetic and evolutionary basis for human susceptibility to shiga toxins. In addition, research is examining the ability of shiga toxins to gain access to the cytoplasm by exploiting normal quality control mechanisms in the endoplasmic reticulum.

Robert J. Hayashi, M.D., 9S St. Louis Children's Hospital, 454-4118. Laboratory investigation is focused on the role of T lymphocytes in immune tolerance during viral and bacterial infection. Clinical research interests are in the area of BMT.

Keith A. Hruska, M.D., 5th Floor McDonnell Pediatric Research Building, 286-2772. The research in the laboratory focuses on new therapies for chronic kidney disease, osteoarthritis and their complications. The mechanisms of action of these therapies for nephropathy, vascular calcification and renal bone disease are being analyzed, as are mechanisms enabling cartilage transplantation.

Paul Hruz, M.D., Ph.D., 3rd Floor McDonnell Pediatric Research Building, 454-6051. Research interests include structure/function relationships in facilitative glucose transporters, congenital and acquired lipodystrophy syndromes, and insulin resistance associated with HIV protease inhibitor therapy.

David M. Jaffe, M.D., 4S50 St. Louis Children's Hospital, 454-2341. Clinical research interests are: (1) occult bacteremia—identification, clinical decision making; (2) trauma—injury prevention, head and cervical spine injuries; (3) health care delivery system—role of the pediatric emergency department; and (4) pain management.

Judith E. C. Lieu, M.D., 3S35 Children's Hospital and 8th Floor McMillan, 454-2138. Clinical Outcomes Research in Pediatric Otolaryngology. The Clinical Outcomes Research office performs clinical epidemiology and health services research. (Please reference the research elective offered by Dr. Jay Piccirillo in otolaryngology for more details.) These techniques and methodologies are used to investigate clinical problems seen in pediatric otolaryngology. Projects include the follow-up and evaluation of newborn hearing screening programs, progression of hearing loss in children, and evaluation of unilateral hearing loss. Other projects of the student's choosing that would utilize these research techniques may also be pursued.

Lori Luchtman-Jones, M.D., 9S St. Louis Children's Hospital, 454-6018. Investigative efforts are focused on clinical coagulation and sickle cell disease.

Jeff McKinney, M.D., Ph.D., 6th Floor McDonnell Pediatric Research Building, 286-2912. Our laboratory is interested in the pathogenesis of bacterial infections and is using novel techniques of bacterial gene regulation to dissect host-pathogen interactions. We are investigating the effects of dynamically modulating virulence gene expression in *E. coli* and pathogenic *Salmonella*, using these bacteria as models of gram negative pathogens responsible for a wide range of serious infections. To modulate gene expression, we employ a system of inducible gene product disruption, involving RNA molecules called external guide sequences (EGSs) which target specific mRNA for cleavage by cellular RNase P. Potential implications of these research efforts include gaining insights to help develop new antimicrobial agents and strategies designed to counter bacterial drug resistance, and to better understand the various functions of RNA molecules in bacteria.

Virginia L. Miller, Ph.D., 6103 McDonnell Pediatric Research Building, 286-2891. Molecular basis of the pathogenesis of the enteric pathogens *Yersinia enterocolitica* and *Salmonella typhimurium* and the respiratory pathogen *Klebsiella pneumoniae*.

Louis Muglia, M.D., Ph.D., 4108 McDonnell Pediatric Research Building, 286-2847. Studies in our laboratory seek to determine: 1) the mechanism determining the timing of parturition; and 2) the role and regulation of hypothalamic neuropeptides involved in the stress response and reproduction, utilizing transgenic and gene knockout mice.

William C. Parks, Ph.D., 5102 McDonnell Pediatric Research Building, 286-2862. Research is focused on regulation of matrix and proteinase production as well as biological functions of proteinases.

J. Perez Fontan, M.D., 5S20 St. Louis Children's Hospital, 454-2527. Airway nerves and inflammation. Biology of the airway intrinsic neuronal network and its role in airway neurogenic inflammation.

Scott Saunders, M.D., Ph.D., 4105 McDonnell Pediatric Research Building, 286-2850. Investigative efforts are aimed at understanding the molecular basis of development through cell and molecular biological approaches, including transgenic and knockout mouse technology. Specific areas of interests are: (1) understanding the role of cell surface heparan sulfate proteoglycans in morphogenesis; and (2) the biology of neuron migration in development of the central nervous system.

Alan L. Schwartz, M.D., Ph.D., 3S36 St. Louis Children's Hospital, 454-6005. Investigative efforts are aimed at understanding: (1) the biology of cell surface receptors including biochemical and molecular dissection of the mechanisms responsible for receptor-mediated endocytosis of blood coagulation proteins; and (2) the regulation of intracellular protein turnover.

Shalini Shenoy, M.D., 9S St. Louis Children's Hospital, 454-6018. Investigation of immunologic basis of graft versus host disease.

Carl H. Smith, M.D., 2N68 St. Louis Children's Hospital, 454-6029. We investigate the cellular process underlying the maternal/fetal transport of amino acids and other nutrients by the human placental syncytiotrophoblast. This goal is approached through isolation and individual study of the maternal- and fetal-facing plasma membranes of the syncytiotrophoblast and through culture of cells derived from placental trophoblast. Cloned transporters are used when appropriate to understand transporter structure, function and interrelationships. Current investigations include: (1) the cloning of cDNAs for placental membrane transporters; (2) their expression in model systems for comparison with transport in membrane isolated directly from placenta; and (3) investigations of the effects of hypoxia on trophoblast amino acid transport.

Joseph W. St. Geme, M.D., 6110 McDonnell Pediatric Research Building, 286-2887. The molecular basis of *Haemophilus influenzae* pathogenicity. *Haemophilus influenzae* is a common cause of localized respiratory tract infections, such as otitis media, sinusitis and pneumonia. In addition, this organism is an important cause of meningitis and septicemia. We are employing methods of molecular and cell biology to characterize the bacterial and the host cell factors involved in the pathogenesis of disease due to this model mucosal pathogen.

Gregory A. Storch, M.D., Max Q. Arens, Ph.D., Richard S. Buller, Ph.D., and staff, 2N52 St. Louis Children's Hospital, 454-6079. Rapid diagnosis of viral and other unconventional infections. The Diagnostic Virology Laboratory is studying the use of the polymerase chain reaction and

oligonucleotide sequencing for the diagnosis of infections caused by viruses and other unconventional pathogens, and the detection of resistance to antimicrobial agents. Current projects include: (1) the detection of herpes simplex viruses, BK Virus in blood or organ transplant recipients; (2) the detection of respiratory pathogens; and (3) the molecular detection and epidemiology of antibiotic resistance. Future projects will explore other infections caused by other unconventional pathogens that are not easily diagnosed using existing methods, and the application of PCR for quantitation of infectious agents and the detection of resistance to antiviral agents.

Robert C. Strunk, M.D., 11th Floor McDonnell Pediatric Research Building, 4905 Children's Place, 454-2694. Clinical studies of patients with asthma aimed at understanding the mechanisms of death due to asthma in children.

Neil H. White, M.D., C.D.E., 11th Floor McDonnell Pediatric Research Building, 286-1157. Our work involves patient-oriented research in the management of diabetes in children. Arrangements can be made for involvement in or development of projects aimed at improving outcome or prevention of diabetes mellitus and its complications.

David B. Wilson, M.D., Ph.D., 3102 McDonnell Pediatric Research Building, 286-2834. Research is focused on the molecular switches that regulate control genes during early embryonic development and differentiation.

## Faculty

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**THEODORE C SIMON, PHD** Research Assistant Professor of Pediatrics  
**PAUL S SIMONS, MD** Associate Professor of Pediatrics  
**GAUTAM K SINGH** Associate Professor of Pediatrics (Pending Executive Faculty Approval)  
**VIPUL SINGLA, MD** Instructor in Pediatrics  
**CARL JEFFREY SIPPEL, MD, PHD** Assistant Professor of Clinical Pediatrics  
**HAROLD B SITRIN, MD** Assistant Professor of Clinical Pediatrics  
**CARL HUGH SMITH, MD** Professor of Pediatrics  
**MATTHEW D SMYTH** Assistant Professor of Pediatrics  
**NARESHKUMAR J SOLANKI** Instructor in Clinical Pediatrics  
**ROBERT D SPEWAK, MD** Instructor in Clinical Pediatrics  
**CRAIG A SPIEGEL, MD** Instructor in Clinical Pediatrics  
**MYTHILI SRINIVASAN, MD, PHD** Instructor in Pediatrics  
**NORMAN P STEELE, MD** Instructor in Clinical Pediatrics  
**RANDALL S STERKEL, MD** Instructor in Clinical Pediatrics  
**ANITA R STIFFELMAN, MD** Assistant Professor of Clinical Pediatrics  
**GREGORY A STORCH, MD** Professor of Pediatrics  
**ROBERT H STRASHUN, MD** Assistant Professor of Clinical Pediatrics  
**M. ANNE STREET, MD** Assistant Professor of Clinical Pediatrics  
**ROBERT C STRUNK, MD** Professor of Pediatrics  
**JOSEPH W ST. GEME, MD** Professor of Pediatrics  
**STUART C SWEET, MD, PHD** Assistant Professor of Pediatrics  
**SUSAN C. SYLVIA** Instructor in Clinical Pediatrics  
**PHILLIP IRWIN TARR, MD** Professor of Pediatrics

**JEFFREY H TECKMAN, MD** Assistant Professor of Pediatrics  
**JESSIE L TERNBERG, MD, PHD** Professor Emerita of Surgery in Pediatrics  
**BRADLEY TERRILL THACH, MD** Professor of Pediatrics  
**KWEE L THIO, MD, PHD** Assistant Professor of Pediatrics  
**JEAN HOLOWACH THURSTON, MD** Professor Emerita of Pediatrics  
**MARY A TILLMAN, MD** Professor of Clinical Pediatrics  
**ROBERT W TOLAN, JR., MD** Instructor in Clinical Pediatrics  
**NORMAN EDWIN TREVATHAN, III, MD** Professor of Pediatrics  
**JEANNE M TRIMMER, MD** Instructor in Clinical Pediatrics  
**GARLAND R TSCHUDIN, MD** Instructor in Clinical Pediatrics  
**MICHAEL P TURMELLE** Instructor in Pediatrics  
**JAMES K TURNER, MD, BA** Associate Professor Emeritus of Pediatrics  
**ROBERT LAWRENCE TYCHSEN, MD** Professor of Ophthalmology and Visual Sciences in Pediatrics  
**APRIL L TYUS** Instructor in Clinical Pediatrics  
**ELIZABETH CHAN UONG, MD** Assistant Professor of Pediatrics  
**AKSHAYA J VACHHARAJANI** Instructor in Pediatrics  
**TERESA JANE VIETTI, MD** Professor Emeritus of Pediatrics  
**COLLEEN M WALLACE, MD** Instructor in Pediatrics  
**MIA C WALLACE** Research Scientist of Pediatrics  
**MICHAEL S WATSON, PHD** Adjunct Professor of Pediatrics  
**ROGER J WAXELMAN, MD** Instructor in Clinical Pediatrics  
**MARC E WEBER, MD, JD** Assistant Professor of Clinical Pediatrics  
**SCOTT J WEINER, MD, PHD** Instructor in Clinical Pediatrics  
**DON WEISS, MD** Instructor in Clinical Pediatrics  
**ALISON J WHELAN, MD** Associate Professor of Pediatrics  
**ANDREW J WHITE, MD** Assistant Professor of Pediatrics  
**NEIL HARRIS WHITE, MD** Professor of Pediatrics  
**KAREN WHITESIDE** Instructor in Clinical Pediatrics  
**MICHAEL PETER WHYTE, MD** Professor of Pediatrics  
**KAREN MORI WICKLINE, MD** Associate Professor of Pediatrics  
**DENISE WILFLEY** Professor of Pediatrics  
**GEORGE T WILKINS JR, MD** Assistant Professor of Clinical Pediatrics  
**KRISTINE G WILLIAMS, MD** Instructor in Pediatrics  
**DAVID B WILSON, MD, PHD** Associate Professor of Pediatrics  
**FRANK S WISSMATH, MD** Associate Professor Emeritus of Clinical Pediatrics  
**PATRICIA ANN WOLFF, MD** Associate Professor of Clinical Pediatrics  
**ANGELA R WONG, MD** Instructor in Pediatrics  
**MICHAEL WONG, MD, PHD** Assistant Professor of Pediatrics  
**GERALD WOOL, MD** Associate Professor of Clinical Pediatrics  
**JEFFREY M WRIGHT, MD** Assistant Professor of Clinical Pediatrics  
**RALPH A WUEBKER, JR, MD** Instructor in Pediatrics  
**KATHIE R WUELLNER, MD** Assistant Professor of Clinical Pediatrics  
**HAYLEY WURZEL** Instructor in Clinical Pediatrics  
**KELVIN A YAMADA, MD** Associate Professor of Pediatrics

**MONA YASSIN, MD** Instructor in Clinical Pediatrics

**JULIA CATHERINE YOUNG** Instructor in Clinical Pediatrics

**CECILIA H YU, MD** Instructor in Clinical Pediatrics

**BARBARA ANN ZEHNBAUER, PHD** Associate Professor of Pediatrics

**MIN ZHANG** Instructor in Pediatrics

## Department's Website

<http://peds.wustl.edu/>

## Department of Psychiatry

Instruction in psychiatry is given during the second, third and fourth years of the medical curriculum. Emphasis is on the teaching of psychiatry as a medical discipline, including the biological, social and psychological mechanisms and manifestations of psychiatric illness, as well as psychological reactions to other illnesses. Psychiatric disorders are common and disabling illnesses. An explosion of knowledge resulting from research in neuroscience, genetics and epidemiology is leading to exciting advances in understanding and treating these disorders. Our department is heavily involved in this research and our didactic curriculum integrates current clinical information with research advances in order to help students develop the knowledge, skills and attitudes to recognize these illnesses and understand the basic principles of treatment.

### **WILLIAM GREENLEAF ELIOT DIVISION OF CHILD PSYCHIATRY**

The Division of Child Psychiatry offers a varied teaching program for medical students, residents in psychiatry and fellows at St. Louis Children's Hospital and the Child Psychiatry Center. The center provides outpatient services to a varied and broad population of children with mental disorders. Trainees are assigned to these various services, where they participate in diagnostic evaluations and see patients in treatment, under supervision of a fellow and attending physician.

## Courses

### ***Second Year***

#### **M85 676A DISEASES OF THE NERVOUS SYSTEM: PSYCHIATRY**

Instructor: Melissa A. Swallow M.D., 362-2440

This course emphasizes the diagnosis of major psychiatric illnesses in adults and children. Psychiatric diseases are described in terms of epidemiology, clinical presentation, natural history, genetics, differential diagnosis and clinical management. Interviewing techniques and performance of the mental status exam will be demonstrated by patient interviews.

### ***Third Year***

#### **M85 770 PSYCHIATRY CLERKSHIP**

Instructor: Kevin J. Black, M.D., 362-2469

Up to 11 students spend four weeks on the inpatient psychiatry service of either Barnes-Jewish Hospital or Metropolitan St. Louis Psychiatric Center. At either site, students evaluate and treat patients under the supervision of house staff and an attending physician, attend teaching conferences, including small group sessions with a psychiatrist that cover the psychiatric interview, and complete other assigned learning experiences. See [www.psychiatry.wustl.edu/Education/Med%20student/wums3info.htm](http://www.psychiatry.wustl.edu/Education/Med%20student/wums3info.htm) for current details or to review the goals of the clerkship.

#### **M85 771 AMBULATORY CLERKSHIP: PSYCHIATRY FOR GENERALISTS**

Instructor: Kevin J. Black, M.D., 362-2469

Up to six students may elect to pursue their ambulatory medicine selective through the Department of Psychiatry. Students submit a written review of a relevant clinical topic of their choice, and participate in clinical duties. Students will be assigned to one of the following clinical options:



Barnes-Jewish Hospital adult psychiatry clinic and community psychiatry, psychiatry consultation service, Metropolitan St. Louis Psychiatric Center emergency room, BJC Behavioral Health or child psychiatry clinic. As of this writing, there is no night call at any site. See [www.nil.wustl.edu/labs/kevin/psy/options.htm](http://www.nil.wustl.edu/labs/kevin/psy/options.htm) for further details.

## ***Fourth Year***

### **Electives**

#### **M85 805 PSYCHIATRY CONSULT SERVICE**

Instructor(s): Carol North, M.D., 747-2013

Location: 14300B East Pavilion, Barnes-Jewish Hospital, South Campus

Elective Contact: Carol North, M.D., 747-2013

Other Information: Students should contact the consult team by voice mail at 848-2402, 8:00 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The fourth-year student will work closely with the consult resident and consult team that also includes the attending and advanced practice nurse in the evaluation and treatment of patients referred to the psychiatry consult service. The student will attend weekly consult/liaison teaching conferences, as well as Grand Rounds and Research Rounds.

Student time distribution: Inpatient 90%, Conferences/Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attendings and residents

Patients seen/weekly: 3 workups per week expected; follow up to 10 or more

On call/weekend responsibility: None

#### **M85 810 OUTPATIENT COMMUNITY PSYCHIATRY**

Instructor(s): Laura Bierut, M.D., 362-3492

Location: Wohl Clinic and community sites

Elective Contact: Laura Bierut, M.D., 362-3492

Other Information: Location of first meeting will be specified in a mailing.

Enrollment limit per period: minimum 2; maximum 3.

Valid start weeks for 4-week blocks are: Weeks 13 and 17.

This is a flexible clerkship where effort is made to tailor the activities to the students' interests. Students will assist in diagnosis and treatment of adult psychiatric clinic and ER patients. The patients present with a wide variety of psychological and interpersonal problems, as encountered in an everyday office practice of an internist or general practice specialist. In this setting, the student will have the opportunity to learn a variety of treatment techniques under supervision. Students completing the clerkship have indicated their enjoyment of the opportunity for independent patient management.

Student time distribution: Outpatient/ER 80%, Conferences/Lectures 20%; Subspecialty Care 100%

Major teaching responsibility: Attendings and residents

Patients seen/weekly: 20

On call/weekend responsibility: None

#### **M85 831 ELECTROCONVULSIVE THERAPY (ECT)**

Instructor(s): Keith Isenberg, M.D., and ECT staff, 362-1819

Location: Barnes-Jewish Hospital, South Campus

Elective Contact: Keith Isenberg, M.D., 362-1819

Other Information: Students should call Dr. Isenberg prior to scheduling the elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The student will be involved in the neuropsychiatric assessment of patients referred for ECT. In addition, the student will receive training in the application of ECT and in the clinical management of patients receiving ECT. The student will be encouraged to review appropriate literature and make clinically relevant case-oriented presentations.

Student time distribution: Inpatient 80%, Outpatient 15%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Keith Isenberg, M.D.

Patients seen/weekly: 40

On call/weekend responsibility: None

#### M85 836 CLINICAL PSYCHIATRY -- INPATIENT PSYCHIATRIC SERVICE

Instructor(s): Eugene Rubin, M.D., Ph.D., 362-2462

Location: Renard Hospital

Elective Contact: Eugene Rubin, M.D., Ph.D., 362-2462

Other Information: Students report to Dr. Rubin's office, 4409 Renard, 8:30 a.m. first day of elective.

Enrollment limit per period: 3

Valid start weeks for 4-week blocks are: Weeks 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This is a senior rotation that provides the students with an opportunity to expand their knowledge of inpatient clinical psychiatry by functioning as externs. Students attend all staffing and teaching conferences given to first-year psychiatry residents, take patients in rotation, and share night call with other first-year residents approximately every fifth night.

Immediate supervision is provided by the inpatient attending, and additional supervision can be arranged as desired. Teaching emphasis is directed toward psychiatric diagnosis, appropriate use of psychopharmacologic agents, psychotherapeutic intervention, use of community resources and pursuit of the psychiatric scientific literature.

Student time distribution: Inpatient 85%, Conferences/Lectures 15%; Subspecialty Care 100%

Major teaching responsibility: Single clinical attending, teaching attendings and single resident

Patients seen/weekly: 5-7

On call/weekend responsibility: Every fifth night

#### M85 840 CHILD PSYCHIATRY

Instructor(s): Gary Boxer, M.D., 286-1740

Location: Montclair Building, 24 S. Kingshighway, Outpatient Psychiatry Clinic

Elective Contact: Gary Boxer, M.D., 286-1740

Other Information: Interested students should contact Dr. Gary Boxer at 286-1740 in the Department of Psychiatry.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This elective in child psychiatry utilizes the Child Psychiatry Outpatient Clinic at St. Louis Children's Hospital. It provides experience in age-appropriate diagnostic and treatment methods in children and adolescents. Experience is also provided on the Consultation Service of St. Louis Children's Hospital. A paper on topic of student's choosing is required.

Student time distribution: Outpatient 75%, Conferences/Lectures 25%; Subspecialty Care 100%

Major teaching responsibility: Attendings and fellows

Patients seen/weekly: 12

On call/weekend responsibility: None

## Research

### **(M85 900)**

Andrey Anokhin, Ph.D., Suite 2T, Montclair Building, 18 S. Kingshighway, 286-2201. E-mail:

anokhin@matlock.wustl.edu. Genetics of brain function and behavior in relation to substance abuse.

This research elective is intended for students interested in biological psychology, psychophysiology, psychopharmacology of drugs of abuse, and behavior genetics. Dr. Anokhin is conducting experimental studies with human volunteers, including twins, in order to better understand biobehavioral mechanisms underlying nicotine and alcohol addiction, as well as possible mediators of risk such as behavioral disinhibition and negative affect. One of the studies explores genetic influences on brain activity and autonomic measures related to inhibitory control of behavior and processing of emotional information. Identical and fraternal twins are assessed using quantitative

electroencephalogram (EEG) and event-related potentials (ERPs) recorded during a variety of behavioral tasks and administered neuropsychological tests and personality questionnaires. Another study investigates the effects of cigarette smoking and nicotine deprivation on cognitive and emotional functioning. Another study looks at the effects of moderate dose of alcohol on brain function and performance. Interested students will be able to learn a variety of methods used in these studies including digital EEG and ERPs; startle response measures; emotion induction using affective pictures, self-report measures and questionnaires, and collection of blood samples for DNA analysis. Format of this research elective will include (1) directed reading; (2) participation in laboratory experiments with human subjects; (3) analysis of existing data from alcohol and smoking challenge experiments. Qualifications: Reliability and responsibility, ability to commit specified amount of time per week and work on schedule (can be negotiated on an individual basis), PC experience, and willingness to obtain short training and certification in ethical issues related to human studies.

Laura Jean Bierut, M.D., Wohl Clinic, 362-3492. This research elective will focus on analyzing data from a high-risk study of addiction. Cocaine dependent individuals were recruited from chemical dependency treatment centers and their relatives were interviewed. Students will have the opportunity to examine family and environmental factors that place some at risk for developing alcohol and other substance dependence.

Kevin J. Black, M.D., 2210 Renard, 362-2469. Students will participate in ongoing neuroimaging studies of movement disorders or neuropsychiatric illnesses. Degree of participation will relate to the student's available research time, skills and interest. See [www.nil.wustl.edu/labs/kevin](http://www.nil.wustl.edu/labs/kevin) for examples of past research.

Robert J. Cormier, Ph.D., G016, Biotechnology Building, 362-8658. Neuron-Astrocyte Interaction. Astrocytes are integral components of brain function. In addition to their critical role in metabolic support for neurons, astrocytes may participate in information processing through cytoplasmic  $Ca^{2+}$  elevations, which are triggered by synaptic transmission, travel as waves across and among astrocytes, and may be transmitted by neurons. The student will be introduced to methods for studying the physiology of and bi-directional communication between neurons and astrocytes. These methods include fluorescent imaging of  $Ca^{2+}$  and electrophysiology.

Linda B. Cottler, Ph.D., Parc Frontenac Building, 286-2252. There are several NIH-funded projects pertaining to many broad areas of research: (1) studies to prevent HIV high-risk behaviors in women who use drugs or drink heavily; (2) work on the reliability and validity of interviews that assess dependence disorders; (3) ecstasy abuse and dependence among teens and young adults.

John G. Csernansky, M.D., 6612 Renard Hospital, 747-2160. Neurobiology of schizophrenia. Students may participate in the conduct of clinical or preclinical studies of schizophrenia and related topics. Involvement in clinical studies can include training and experience in interviewing psychiatric patients, or gaining experience in the techniques of brain imaging. Involvement in preclinical studies can involve training and experience in receptor binding, microdialysis, immunohistochemistry, and animal behavior.

Renee M. Cunningham-Williams, Ph.D., M.P.E., 40 N. Kingshighway, Suite 4, 286-2264. Problem and Pathological Gambling. Students choosing this research elective may learn research skills by being involved in data analysis, report and manuscript writing, data editing, verification, management, writing of diagnostic computer scoring algorithms and other activities as they relate to problem and pathological gambling behavior: (1) GAM Development Study: data available for analysis of 10 transcribed focus groups and 108 gambling SOGS screening tests and pretests of the GAM assessment instrument; (2) GAMCO Study (NIDA K01 DA 04030) - currently collecting reliability and validity data among 300 gamblers, on the computerized GAM, as well as supplementary substance abuse and psychiatric information and collateral informant data ( $n=150$ ); (3) CPH-100-0600 (industry-funded) multi-site clinical medication trial data available for analysis on the effects of a investigational drug to treat severe gambling disorders; (4) GAM Ancillary Study (unfunded)--multi-site validity data available comparing the GAM-IV-12 (structured, non-clinician) to clinician ratings and self-administered measures of gambling behavior among those screened in the CPH-100-0600 study; (5) GAPP Study (NIDA R01 DA015032;), data being collected using personal interviews of gambling behavior as well as a comprehensive SCID personality assessment conducted by clinicians among 150 gamblers interviewed in the GAMCO study.

Gabriel A. de Erausquin, M.D., Ph.D., G02 Biotechnology Building, 362-5186. Molecular mechanism of ethanol-induced suppression of adult neurogenesis in mice. Students may participate and carry out experiments in an animal model of chronic alcoholism using transgenic mice with null mutations in a variety of cell death and neuroprotective proteins. Experiments include labeling, identification,

characterization and counting of newly generated neurons in the adult hippocampus. They may also participate in the preparation of cell cultures of neuronal precursors isolated from adult mouse brain of transgenic mice, and in the execution of experiments on alcohol toxicity in cultured differentiated and undifferentiated neural precursors.

Alison Goate, D.Phil., G04A Biotechnology Building, 362-8691. Genetic studies of Alzheimer's disease. Studies can involve laboratory-based projects on the genetics or cell biology of Alzheimer's disease or clinical studies involving the collection of data through telephone or personal interview of individuals with a family history of dementia.

John W. Newcomer, M.D., 4410 Renard Building, 362-5939. Clinical memory research; research concerning the control of weight and glucose and lipid metabolism. This elective offers the student a broad exposure to clinical protocols related to the neurochemical regulation of memory performance and glucose metabolism, including protocols in patients with schizophrenia. Students will have an opportunity to focus on a particular project of interest.

Carol North, M.D., 2210 Renard, 747-2013. The student will work closely with Dr. North in various aspects of ongoing research projects in psychiatric epidemiology and clinical studies or topics of the student's choice. Ongoing studies include drug abuse and the homeless population, research on populations affected by disasters and terrorism, electroconvulsive therapy, psycho-education for serious mental illness, psychiatric aspects of gastrointestinal disease, and somatoform disorders. Potential activities include subject interviews, editing, data entry, data analysis, literature reviews and writing papers for publication.

Rumi Kato Price, Ph.D., M.P.E., Parc Frontenac, 40 N. Kingshighway, Suite 2, 286-2282. The student will work closely with Dr. Price on ongoing research projects in substance abuse and psychiatric epidemiology. The current projects include: a longitudinal study of the impact of drug abuse and war trauma; a focused study on protective factors mitigating suicidal risk; an international epidemiologic study of developmental psychopathology; a large scale international genetic epidemiology study focusing on gene-environment interactions involving substance abuse; epidemiologic applications of highly-flexible computational techniques.

Yvette Sheline, M.D., Renard 1115, East Building 2109, 362-8422. Two-month minimum. Opportunity for students with computer programming skills to work closely with Dr. Sheline in a neuroimaging project investigating brain activation in the limbic system in response to emotional stimuli. Students will be involved in acquiring and analyzing fMRI data, interviewing patients and writing up results.

NOTE TO STUDENTS: There are always a number of research projects in the Department of Psychiatry. For additional information contact Dr. Rubin, 362-2462.

## Faculty

**CHARLES F ZORUMSKI, MD** Head of The Department of Psychiatry, Samuel B. Guze Professor of Psychiatry

**AQEEB AHMAD** Instructor in Clinical Psychiatry

**DALE J ANDERSON, MD** Instructor in Clinical Psychiatry

**RICHARD H ANDERSON, MD, PHD** Instructor in Clinical Psychiatry

**ANDREY P ANOKHIN, PHD** Research Assistant Professor of Psychiatry

**E. JAMES ANTHONY, MD, PHD** Professor Emeritus of Psychiatry (Child Psychiatry)

**SCOTT J ARBAUGH, MD** Instructor in Clinical Psychiatry

**AHMAD BEHESHTI ARDEKANI, MD** Assistant Professor of Clinical Psychiatry

**MICHAEL ROMAN BANTON, MD** Instructor in Clinical Psychiatry (Child Psychiatry)

**DEANNA BARCH, PHD** Assistant Professor of Psychology in Psychiatry

**RONALD BEACH, MD** Instructor in Clinical Psychiatry

**SAVITA BHAT, MS** Instructor in Clinical Psychiatry

**LAURA J BIERUT, MD** Associate Professor of Psychiatry

**KEVIN J BLACK, MD** Associate Professor of Psychiatry

**KELLY N BOTTERON, MD** Associate Professor of Psychiatry (Child Psychiatry)

**GARY BOXER, MD** Assistant Professor of Psychiatry (Child Psychiatry)

**SUSAN KATHLEEN BOYER, MD** Instructor in Clinical Psychiatry

**ALLYSON BOYLE, MD** Instructor in Clinical Psychiatry

**ROBERT HARRY BRADY, MD** Instructor in Clinical Psychiatry (Child Psychiatry), Adjunct Instructor in Psychiatry (Child Psychiatry)

**KATHLEEN K BUCHOLZ, PHD, MS** Research Professor of Psychiatry

**JAMES BYRD, MD** Instructor in Clinical Psychiatry (Child Psychiatry)

**ROBERT MICHAEL CARNEY, PHD** Professor of Psychiatry

**ZHOUFENG CHEN, PHD** Assistant Professor of Psychiatry

**THEODORE J CICERO, PHD** Professor of Neuropharmacology in Psychiatry

**THEODORE J CICERO, PHD** Vice Chairman for Research, Department of Psychiatry

**WILLIAM W CLENDENIN, MD** Assistant Professor of Clinical Psychiatry

**C. ROBERT CLONINGER, MD** Wallace Renard Professor of Psychiatry

**DAVID M CONNER, MD** Instructor in Clinical Psychiatry

**JOHN NICHOLAS CONSTANTINO, MD** Assistant Professor of Psychiatry (Child Psychiatry)

**ROBERT J CORMIER, PHD** Research Instructor in Psychiatry

**JUAN C CORVALAN, MD** Assistant Professor Emeritus of Clinical Psychiatry

**LINDA B COTTLER, PHD** Professor of Epidemiology in Psychiatry

**JACK L CROUGHAN, MD** Associate Professor of Clinical Psychiatry, Adjunct Associate Professor of Psychiatry

**JOHN G CSERNANSKY, MD** Gregory B Couch Professor of Psychiatry

**ALEJANDRO M DATUIN, MD, AA** Assistant Professor of Clinical Psychiatry (On Staff at Malcolm Bliss Mental Health Center)

**MARY A DAVIS, MD** Assistant Professor of Clinical Psychiatry

**GABRIEL A DE ERAUSQUIN, MD, PHD** Assistant Professor of Psychiatry

**JON TODD DEAN, MD** Instructor in Clinical Psychiatry

**PAUL DEWALD, MD** Assistant Professor of Clinical Psychiatry

**PLARIDEL C DEZA, MD** Assistant Professor of Clinical Psychiatry (On Staff at Malcolm Bliss Mental Health Center)

**DANIELLE MARIE DICK, PHD** Research Assistant Professor of Psychiatry

**HONGXIN DONG, PHD** Research Instructor in Psychiatry

**JAMES EARL EDWARDS, MD** Assistant Professor of Clinical Psychiatry (Child Psychiatry)

**SETH A EISEN, MD** Professor of Psychiatry

**NURI BRADFORD FARBER, MD** Assistant Professor of Psychiatry

**CYNTHIA FLORIN, MD** Instructor in Clinical Psychiatry

**KENNETH E FREEDLAND, PHD** Professor of Psychiatry

**DARRIN FRIESEN, MD** Instructor in Clinical Psychiatry

**TERRY A FULLER, MD** Assistant Professor of Clinical Psychiatry

**AMELIA GALLITANOMENDEL, MD, PHD** Instructor in Psychiatry

**KEITH S. GARCIA, MD, PHD** Assistant Professor of Psychiatry

**NICK S. GARG** Instructor in Clinical Psychiatry (Child Psychiatry)

**FRED W GASKIN, MD** Associate Professor of Clinical Psychiatry

**BARBARA GELLER, MD** Professor of Psychiatry (Child Psychiatry)

**LUIS GIUFFRA, MD, PHD** Assistant Professor of Clinical Psychiatry

**ANNE L GLOWINSKI, MD** Assistant Professor of Psychiatry (Child Psychiatry)

**ALISON GOATE, PHD** Professor of Genetics in Psychiatry  
**DAVID GOLDMEIER, MD** Instructor in Clinical Psychiatry  
**JULIA D. GRANT, PHD** Research Instructor in Psychiatry  
**RICHARD GRUCZA** Research Instructor in Psychiatry  
**DEBRA A. GUSNARD, MD** Assistant Professor of Psychiatry  
**ANNA E HARTNETT, MD** Assistant Professor of Clinical Psychiatry  
**THOMAS D HARTNETT, MD** Assistant Professor of Clinical Psychiatry  
**STEVEN ARTHUR HARVEY, MD** Instructor in Clinical Psychiatry  
**DAN W. HAUPT, MD** Instructor in Psychiatry  
**ANDREW C HEATH, PHD** Spencer T. Olin Professor of Psychology in Psychiatry  
**TAMARA G HERSHEY, PHD** Assistant Professor of Psychiatry  
**GITRY HEYDEBRAND, PHD** Instructor in Psychiatry  
**FREDERICK G HICKS, MD** Assistant Professor of Clinical Psychiatry  
**ROBERT S HICKS, MD** Associate Professor of Clinical Psychiatry  
**TONY L HINRICHS, PHD** Research Instructor in Psychiatry  
**SHELDON G HOLSTAD, PHD, PHS** Assistant Professor of Clinical Pharmacy in Psychiatry (On Staff at Jewish Hospital and St Louis College of Pharmacy)  
**BARRY ALLEN HONG, PHD** Vice Chairman for Clinical Affairs, Department of Psychiatry, Professor of Psychiatry  
**LINDA S HORNE, MD** Instructor in Clinical Psychiatry  
**RICHARD W HUDGENS, MD** Professor of Psychiatry  
**KEITH E ISENBERG, MD** Vice Chairman for Clinical Affairs, Department of Psychiatry, Professor of Psychiatry  
**YUKITOSHI IZUMI, MD, PHD** Research Associate Professor of Psychiatry  
**ALEKSANDAR JANCA, MD** Adjunct Professor of Psychiatry  
**MICHAEL R JARVIS, MD, PHD** Associate Professor of Psychiatry  
**MARK C. JOHNSON, MD** Assistant Professor of Clinical Psychiatry  
**LA RHONDA JONES** Instructor in Clinical Psychiatry (Child Psychiatry)  
**CYNTHIA ANNE JOYNER, PHD** Research Instructor in Psychiatry  
**SAAID KHOJASTEH, MD** Assistant Professor of Clinical Psychiatry  
**VALERIE S. KNOPIK, PHD** Research Instructor in Psychiatry  
**EDWARD H. KOWERT** Associate Professor Emeritus of Clinical Psychiatry  
**WANDA M LAMB, MD** Associate Professor of Clinical Psychiatry  
**F. TIMOTHY LEONBERGER, PHD** Instructor in Clinical Medical Psychology in Psychiatry (On Staff at Malcolm Bliss Mental Health Center)  
**COLLINS E LEWIS, MD** Associate Professor Emeritus of Psychiatry  
**ERVIN LIPSCHITZ, MD** Assistant Professor of Clinical Psychiatry  
**JAY L LISS, MD** Associate Professor of Clinical Psychiatry  
**LOON-TZIAN LO** Instructor in Psychiatry  
**ELIZABETH A LOBOS, PHD** Research Instructor in Psychiatry  
**JOAN L LUBY, MD** Associate Professor of Psychiatry (Child Psychiatry)  
**PATRICK JOSEPH LUSTMAN, PHD** Professor of Psychiatry  
**MICHAEL T. LYNKEY, PHD** Research Assistant Professor of Psychiatry  
**COLIN MACKENZIE** Instructor in Clinical Psychiatry  
**PAMELA A MADDEN, PHD** Assistant Professor of Psychology in Psychiatry  
**VIRGIL LEE MALMBERG, MD** Instructor in Clinical Psychiatry  
**JOSE MATHEWS** Instructor in Clinical Psychiatry, Instructor in Psychiatry

**GREGORY WARREN MATTINGLY, MD** Assistant Professor of Clinical Psychiatry  
**SYDNEY B MAUGHS, MD, BA** Professor Emeritus of Clinical Psychiatry  
**MARCIA JUNE MCCABE, PHD** Instructor in Psychiatry  
**KIMBERLI MCCALLUM, MD** Assistant Professor of Clinical Psychiatry (Child Psychiatry)  
**SCOTT MCCORMICK, III, MD** Assistant Professor of Clinical Psychiatry  
**DOUGLAS E MCCOY, MD** Instructor in Clinical Psychiatry  
**JOSEPH K MCKINNEY, MD** Associate Professor Emeritus of Clinical Psychiatry  
**STEVEN JAMES MENNERICK, PHD** Assistant Professor of Psychiatry  
**JAY L MEYER, MD** Associate Professor of Clinical Psychiatry  
**JAMES R MIKOLAJCZAK, MD** Assistant Professor of Clinical Psychiatry  
**SUSAN MINCHIN, MD, PHD** Instructor in Clinical Psychiatry  
**MARK A MINTUN, MD** Professor of Psychiatry  
**DAVID M MONTANI, MD** Instructor in Clinical Psychiatry  
**MARY ANN MONTGOMERY, MD** Associate Professor of Clinical Psychiatry  
**BLAKE WILLIAM MOORE, PHD** Professor Emeritus of Biochemistry in Psychiatry  
**KRISTA L MOULDER** Research Instructor in Psychiatry  
**RANDI H MOZENTER, PHD** Instructor in Clinical Medical Psychology in Psychiatry  
**GEORGE E MURPHY, MD** Professor Emeritus of Psychiatry  
**RASHMI R NAKRA** Associate Professor of Clinical Psychiatry  
**ELLIOT C NELSON, MD** Associate Professor of Psychiatry  
**ROSALIND J NEUMAN, PHD** Research Associate Professor of Mathematics in Psychiatry  
**JOHN W NEWCOMER, MD** Associate Professor of Psychiatry  
**BRUCE L NOCK, PHD** Associate Professor of Neurobiology in Psychiatry  
**CAROL S NORTH, MD** Professor of Psychiatry  
**PETRA NOWOTNY, PHD** Research Instructor in Psychiatry  
**THOMAS JOHN NOWOTNY, MD** Assistant Professor of Clinical Psychiatry  
**ERIC J NUETZEL, MD** Assistant Professor of Clinical Psychiatry  
**JOHN WILLIAM OLNEY, MD** John P Feighner Professor of Psychiatry  
**THOMAS FREDERIC OLTMANNS, PHD** Professor of Psychiatry  
**PATRICIA L ONEAL, MD** Professor Emerita of Clinical Psychiatry  
**PAUL M PACKMAN, MD** Associate Professor of Clinical Psychiatry  
**MICHELE L. PERGADIA** Research Instructor in Psychiatry  
**ELIZABETH F PRIBOR, MD** Associate Professor of Clinical Psychiatry  
**MADELON T PRICE, PHD** Research Professor Emerita of Neurobiology in Psychiatry  
**RUMI KATO PRICE, PHD** Research Associate Professor of Psychiatry  
**THOMAS R PRZYBECK, PHD** Research Assistant Professor of Psychiatry  
**DANIEL D PUGH, MD** Associate Professor of Psychiatry  
**JOHN S RABUN, MD** Instructor in Clinical Psychiatry  
**DIANE RANKIN, MD** Assistant Professor of Clinical Psychiatry  
**DABEERU C RAO, PHD** Professor of Biostatistics in Psychiatry  
**DEVNANDINI RASTOGI-CRUZ, MD** Assistant Professor of Psychiatry  
**SYED A RAZA, MD** Assistant Professor of Clinical Psychiatry (Child Psychiatry)  
**GWENDOLYN G REICH, PHD** Research Associate Professor of Psychiatry (Child Psychiatry)  
**JOHN P RICE, PHD** Professor of Mathematics in Psychiatry

**CHERYL RICHARDS, PHD** Instructor in Psychiatry

**THOMAS F RICHARDSON, MD** Associate Professor of Psychiatry

**WILLIAM M RIEDESEL, II, MD** Associate Professor of Clinical Psychiatry

**STEPHEN L RISTVEDT, PHD** Assistant Professor of Medical Psychology in Psychiatry

**LEE NELKEN ROBINS, PHD, PHD** Professor Emerita of Sociology in Psychiatry

**JOHN DENO ROGAKOS, MD** Adjunct Instructor in Psychiatry (Child Psychiatry) , Instructor in Clinical Psychiatry (Child Psychiatry)

**JOHN W ROHRBAUGH, PHD** Associate Professor of Psychiatry

**SAUL ROSENZWEIG, PHD** Professor Emeritus of Medical Psychology in Psychiatry

**EUGENE HAROLD RUBIN, MD, PHD** Vice Chairman for Education, Department of Psychiatry, Professor of Psychiatry

**JAMES RUTHERFORD, MD** Assistant Professor of Clinical Psychiatry

**JO-ELLYN M RYALL, MD** Associate Professor of Clinical Psychiatry

**MARCEL T SAGHIR, MD** Professor of Psychiatry

**BERETTE A SALAZAR, MD** Assistant Professor of Clinical Psychiatry

**JEFFREY FRANK SCHERRER, PHD** Research Assistant Professor of Psychiatry (Pending Executive Faculty Approval)

**JEFFREY I SCHULMAN, MD** Instructor in Clinical Psychiatry (Child Psychiatry)

**EARL R SCHULTZ, MD, BS** Associate Professor of Clinical Psychiatry

**ADELITA SEGOVIA LANGLEY** Instructor in Clinical Psychiatry (Child Psychiatry)

**LORETTA K SELESKI, PHD** Assistant Professor Emerita of Medical Psychology in Psychiatry (Child Psychiatry)

**PEARL FISHER SEROTA, MD** Instructor in Clinical Psychiatry

**PAUL W SHEFFNER, MD** Assistant Professor of Clinical Psychiatry

**YVETTE I SHELINE, MD** Associate Professor of Psychiatry

**WILLIAM REESE SHERMAN, PHD** Professor Emeritus of Biochemistry in Psychiatry

**BARBARA SUE SILVERSTEIN, PHD** Assistant Professor of Clinical Psychiatry (Child Psychiatry)

**NATHAN M SIMON, MD** Assistant Professor of Clinical Psychiatry

**REED EARL SIMPSON, MD** Assistant Professor of Clinical Psychiatry

**ERIK J SIREVAAG, PHD** Research Assistant Professor of Psychiatry

**JAMES B SMITH, MD** Associate Professor Emeritus of Clinical Psychiatry

**STACEY L SMITH, MD** Assistant Professor of Clinical Psychiatry

**WAYNE A STILLINGS, MD** Assistant Professor of Clinical Psychiatry

**BRIAN K SUAREZ, PHD** Professor of Psychiatry

**JAGDISH C SURI, MD** Assistant Professor of Clinical Psychiatry (Child Psychiatry)

**VINOD SURI** Instructor in Clinical Psychiatry (Child Psychiatry) (Full-Time at Hawthorn Children's Psychiatric Hospital)

**DRAGAN M SVRAKIC, MD, PHD** Associate Professor of Psychiatry

**NENAD M SVRAKIC, PHD** Research Assistant Professor of Psychiatry

**MELISSA A. SWALLOW, MD** Instructor in Psychiatry

**TIFFANY L. TIBBS** Research Instructor in Psychiatry

**RICHARD D TODD, MD, PHD** Director of the Division of Child Psychiatry in Psychiatry, Blanche Ittleson Professor of Psychiatry (Child Psychiatry)

**ALEXANDRE TODOROV, PHD** Research Assistant Professor of Psychiatry

**MICHELE VAN EERDEWEGH, MD** Instructor in Clinical Psychiatry

**DOROTHY JO VANBUREN** Research Instructor in Psychiatry

**JEN-CHYONG WANG, PHD** Research Instructor in Psychiatry

**LEI WANG, PHD** Research Instructor in Psychiatry

**R. ROBINSON WELCH, PHD** Instructor in Psychiatry



**ZILA WELNER, MD** Associate Professor of Clinical Psychiatry (Child Psychiatry)

**RICHARD D WETZEL, PHD** Professor of Psychiatry

**DENISE WILFLEY** Professor of Psychiatry

**RENEE M WILLIAMS, PHD** Research Associate Professor of Psychiatry

**HAROLD D WOLFF, MD, BS** Associate Professor of Clinical Psychiatry

**EDWIN D WOLFGAM, MD** Assistant Professor of Clinical Psychiatry

**DAVID F WOZNIAK, PHD** Research Associate Professor of Psychiatry

**CHRISTOPHER WUERTZ, MD** Assistant Professor of Clinical Psychiatry

**LUIS H ZAYAS, PHD, MS** Professor of Psychiatry

## Department's Website

<http://www.psychiatry.wustl.edu/>

## Department of Radiation Oncology

The Department of Radiation Oncology was created on July 1, 2001, after being unanimously approved by the Executive Faculty on June 6, 2001. The department has a broad program that focuses on excellence in patient care, innovative research and creative didactic activities for medical students, residents in radiation oncology and other specialties as well as allied health personnel. The department is one of the largest, most academically balanced and best equipped in the country. The Department of Radiation Oncology is responsible for all radiation therapy procedures at Washington University Medical Center.

Our faculty has gained international recognition for innovative technological advances in physics and treatment planning, biological research, computer applications and clinical investigation.

### Milestones

- demonstration of a hypoxic subpopulation in in vivo tumors
- experimentation on biological basis of pre-operative radiation
- customized (Cerroband) shielding system to protect normal tissues during irradiation
- in collaboration with Biomedical Computer Laboratory, design and construction of first small dedicated computer for radiation therapy treatment planning
- in collaboration with Varian Associates and NCI, design and construction of the first generation of high-energy, dual-modality, multiple-energies linear accelerator (Clinac 35)
- development of three-dimensional radiation therapy treatment planning and delivery systems
- clinical applications of 3-D conformal and intensity-modulated radiation therapy
- use of imaging modalities in treatment planning in radiation therapy, including PET scanning

The Department of Radiation Oncology occupies a large, attractive and convenient clinical facility on the ground floor of the Center for Advanced Medicine (about 50,000 gross square feet). The clinical facilities include nine linear accelerator rooms, four 3-D and conventional simulator rooms, and a high dose rate brachytherapy suite with two treatment rooms. Furthermore, the facility houses the Gamma Knife unit, which is operated in collaboration with HealthSouth Corporation. Initially, we will operate with seven state-of-the-art computer control medical linear accelerators with the latest accessories, including multi-leaf collimator. One of the accelerators is equipped to perform intensity-modulated radiation therapy using the Peacock system from NOMOS Corporation. We have advanced treatment planning computer systems for 3-D conformal and intensity-modulated radiation therapy. The modern brachytherapy suite includes capability for high dose rate remote afterloading and for image-guided permanent prostate seed implants. Interstitial and external hyperthermia treatments are also available.

Gamma Knife as well as Linac-based stereotactic irradiation (radiosurgery) programs are in operation. In addition, the Physics faculty have research laboratories and offices on the fourth floor of the Clinical Sciences Research Building. We are in the process of formulating plans for an Innovative Technology Research Center. The administrative offices of the department, as well as the Cancer and Radiation Biology laboratory and faculty offices and the Oncology Information computer systems are housed at the 4511 Forest Park Medical Building. The total amount of space occupied by the department is close to 100,000 square feet.

## **Courses**

### ***First Year***

#### Summer Oncology Clerkship for First-Year Students

An eight-week summer clerkship program is available for first-year medical students. The students participate in the clinical activities of the Radiation Oncology Center and are exposed to the fundamental concepts of cancer biology and clinical radiation therapy in a series of lectures, seminars and case presentation conferences. They have the opportunity to conduct either laboratory research or clinical investigation under the direction of the staff members of the sections of clinical radiation oncology and cancer biology. Joseph R. Simpson, Ph.D., M.D.; Joseph L. Roti Roti, Ph.D.

### ***Third Year***

#### M90 740 Radiation Oncology Clerkship

Instructor: Joseph R. Simpson, M.D., Ph.D., 362-8567

The four-week clerkship in radiation oncology will provide students with the opportunity to participate in the evaluation and management of a broad range of patients referred for consideration of radiation therapy. Clerkship activities will take place entirely within the Barnes-Jewish Hospital/Siteman Cancer Center complex. Students will conduct patient evaluations under the supervision of radiation oncology department residents and faculty. Students will also attend and participate in regularly scheduled departmental conferences, which typically occur on a daily basis at 7 or 7:15 a.m. Monday through Thursday and 8 a.m. on Friday as well as on Thursday afternoons twice monthly. Students will also have the opportunity to attend the appropriate multidisciplinary clinics, follow-up clinics and multidisciplinary conferences (such as pediatric neuro-oncology, cardiothoracic oncology, lymphoma, GYN tumor conferences) pertaining to their rotation schedule.

Instructional materials are available for students on the rotation (students are NOT expected to purchase any curricular materials for the clerkship). Student performance will be evaluated by both resident and faculty members who supervise the student over the course of the four-week clerkship.

### ***Fourth Year***

#### **Electives**

#### M90 840 CLINICAL RADIATION ONCOLOGY

Instructor(s): Joseph Simpson, M.D., 362-8567, and Carlos Perez, M.D., 362-8542

Location: Center for Advanced Medicine, Lower Level

Elective Contact: Joseph Simpson, M.D., 362-8567

Other Information: Students should meet the Chief Resident in the Siteman Cancer Center Conference Room on the lower level of the CAM Building.

Enrollment limit per period: 3

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The clinical division offers an elective with emphasis on the evaluation, planning of and administration of radiation therapy in patients with malignant tumors. The students have the opportunity to enhance their knowledge on the natural history, pathological, and biological features of cancer and to sharpen their clinical skills participating in the management of these patients.

Student time distribution: Inpatient 7%, Outpatient 78%, Conferences/ Lectures 15%; Subspecialty Care 100%

Major teaching responsibility: Attendings, residents, and staff

Patients seen/weekly: 20-35 per physician

On call/weekend responsibility: None

## **Research**

### ***(M90 900)***

Carlos Perez, M.D., Radiation Oncology and Cancer Biology, 362-3499. Broad range of opportunities for investigation in: (1) prognostic factors and therapy outcome in a variety of patients with cancer; (2) three-dimensional treatment conformal and intensity-modulated radiation therapy in the treatment of patients with head and neck, lung, pancreas, rectal or prostate cancer; (3) biological studies exploring mechanisms involved in cellular DNA damages and repair by irradiation, heat and/or cytologic agents; (4) computer applications in data analysis and information systems; and (5) clinical outcome analysis projects.

Jay Locke, M.D., 4511 Forest Park Parkway, 362-9786. The student will have the opportunity to gain first hand exposure to in vitro and in vivo techniques commonly utilized in radiobiological investigation. This is an excellent opportunity for those students interested in pursuing a career in radiation oncology or medical oncology. Ideally, students will contribute to an ongoing project and have the potential to contribute to a manuscript.

## **Faculty**

**CARLOS A PEREZ, MD** Head of The Department of Radiation Oncology , Professor of Radiation Oncology

**KATHY BAGLAN** Instructor in Clinical Radiation Oncology

**WALTER R BOSCH, PHS** Research Assistant Professor of Radiation Oncology

**ANA C BOTERO, MD** Instructor in Radiation Oncology

**JEFFREY D BRADLEY, MD** Assistant Professor of Radiation Oncology

**JOSEPH O. DEASY, PHD** Associate Professor of Radiation Oncology

**VENKATA RAO DEVINENI, MD** Associate Professor of Clinical Radiation Oncology

**ROBERT E DRZYMALA, PHD** Associate Professor of Radiation Oncology

**JACQUELINE ESTHAPPAN, PHD** Instructor in Radiation Oncology

**SEYMOUR FOX, PHD** Instructor in Radiation Oncology

**SREEKRISHNA M GODDU** Assistant Professor of Radiation Oncology

**PERRY W GRIGSBY, MD, MS** Professor of Radiation Oncology

**RYUJI HIGASHIKUBO, PHD** Research Associate Professor of Radiation Oncology

**NOBUO HORIKOSHI, PHD** Assistant Professor of Radiation Oncology

**ERIC E KLEIN** Associate Professor of Radiation Oncology

**ANDREI LASZLO, PHD** Associate Professor of Radiation Oncology

**ZUO-FENG LI, D SC** Associate Professor of Radiation Oncology

**HSIU-SAN LIN, MD, PHD** Professor of Radiation Oncology

**JACOB LOCKE, MD** Assistant Professor of Radiation Oncology

**MACDONALD B LOGIE, MD** Assistant Professor of Clinical Radiation Oncology

**DANIEL ABRAHAM LOW, PHD** Associate Professor of Radiation Oncology

**MUHAMMAD SALEEM MAHMOOD, MD** Instructor in Clinical Radiation Oncology

**ROBERT S MALYAPA, MD, PHD** Assistant Professor of Radiation Oncology

**DAVID B MANSUR, MD** Assistant Professor of Radiation Oncology

**JOHN W MATTHEWS, D SC** Research Assistant Professor of Radiation Oncology

**JEFF MICHAEL MICHALSKI, MD** Associate Professor of Radiation Oncology

**EDUARDO G MOROS, PHD** Associate Professor of Radiation Oncology

**DANIEL F MULLEN, DENT** Instructor in Radiation Oncology

**SASA MUTIC** Associate Professor of Radiation Oncology

**ROBERT J MYERSON, MD, PHD** Professor of Radiation Oncology

**OSCAR D. NORTON, MD** Instructor in Clinical Radiation Oncology

**GILBERT H NUSSBAUM, PHD** Associate Professor Emeritus of Radiation Oncology

**TEJ K PANDITA, PHD** Assistant Professor of Radiation Oncology  
**JAMES VERNON PIEPHOFF, MD** Instructor in Clinical Radiation Oncology  
**GARY A RATKIN, MD** Instructor in Clinical Radiation Oncology  
**KEITH M RICH, MD** Associate Professor of Radiation Oncology  
**BUCK ROGERS, PHD** Assistant Professor of Radiation Oncology  
**JOSEPH L ROTI ROTI, PHD** Professor of Radiation Oncology  
**TAPAN ROY** Instructor in Clinical Radiation Oncology  
**JOSEPH ROGERS SIMPSON, MD, PHD** Associate Professor of Radiation Oncology  
**TODD HOWARD STEINBERG** Instructor in Radiation Oncology  
**WILLIAM L STRAUBE** Research Assistant Professor of Radiation Oncology  
**MARIE E TAYLOR, MD** Assistant Professor of Radiation Oncology  
**WADE L THORSTAD, MD** Instructor in Radiation Oncology  
**MILOS VICIC, PHD** Instructor in Radiation Oncology  
**TERESA JANE VIETTI, MD** Professor Emeritus of Radiology  
**BRUCE J WALZ, MD** Associate Professor of Clinical Radiation Oncology  
**MAI XU, MD, PHD** Research Instructor in Radiation Oncology  
**IMRAN ZOBERI, MD** Instructor in Radiation Oncology

## Department's Website

<http://radonc.wustl.edu/>

## Department of Radiology

The Mallinckrodt Institute of Radiology (MIR) serves as the Department of Radiology for Washington University School of Medicine, helping to guide the consulting physician in the discovery, treatment and, ultimately, the healing of disease. Established in 1930, MIR is one of the largest and most scientifically sophisticated radiology centers worldwide.

Internationally recognized for its groundbreaking research, the Institute continues to pioneer new radiological techniques for better patient care.

### Milestones

- development of the first diagnostic test for gallbladder disease
- design and construction of the first cross-sectional X-ray laminagraph
- collaboration on design and installation of the first cyclotron located in a U.S. medical center
- development of positron emission tomography (PET)
- installation of one of the world's first computed tomography (CT) and magnetic resonance (MR) scanners
- interfacing of a minicomputer with a gamma camera, improving accuracy and efficiency of nuclear medicine procedures
- establishment of the first mobile mammography van west of the Mississippi River
- integration of CT and MR scans with three-dimensional technology
- application of organic chemistry to the preparation of radiopharmaceuticals used in medical imaging
- measurement of cerebral blood flow and metabolism
- establishment of the St. Louis region's most comprehensive interventional radiology center
- application of PET for measuring metabolic activity in relation to cardiac blood flow

The Institute occupies more than 400,000 total square feet, comprising its own 13-story building with satellite facilities in Barnes-Jewish, St. Louis Children's and Wohl hospitals; the Clinical Sciences Research and East buildings; the Scott Avenue Imaging Center; and the Center for Advanced Medicine. The department provides diagnostic radiology, nuclear medicine and radiation physics for all hospitals in the Washington University Medical Center, Barnes-Jewish West County Hospital and Barnes-Jewish St. Peters Hospital.

MIR clinical facilities are on the second floor of the Institute (chest radiology, body computed tomography, operating room imaging, computed radiography); third floor (neuroradiology, MRI, angiography); fourth floor (gastrointestinal and genitourinary radiology); and the fifth floor (MRI). PET clinical and research facilities are available on the seventh floor. A comprehensive interventional radiology center occupies the eighth floor. Nuclear medicine is on the ninth floor of the Barnes-Jewish Hospital West Pavilion. Ultrasonography, currently housed on the 10th floor of the West Pavilion, will move to the fourth floor of the Institute in 2004. Orthopedic imaging is on the sixth floor of the Center for Advanced Medicine. The Breast Health Center, on the fifth floor of the Center for Advanced Medicine, is a multidisciplinary facility that provides a full range of breast imaging services and interventional procedures. In the north wing of St. Louis Children's Hospital is a complete pediatric radiology facility, offering ultrasound, nuclear medicine, CT and MRI. The diagnostic facilities at Barnes-Jewish Hospital north offer state-of-the art equipment and a staff of talented specialists in abdominal and chest radiology, MRI, nuclear medicine and interventional radiology. Musculoskeletal radiology services are available on the sixth floor of the Center for Advanced Medicine.

The Institute has 102 examination rooms for diagnostic radiology, one PET/CT scanner, nine CT scanners (all with spiral CT capability and two with multidetector arrays), six PET scanners, 12 MR scanners (six devote to research), 16 ultrasound machines, and six mammography units. In addition, as part of the department's community outreach effort, the Institute cosponsors with Barnes-Jewish Hospital a mobile mammography van that provides screening services at corporate and public sites in the St. Louis metropolitan area.

MIR research facilities are in the Clinical Sciences Research Building (radiological sciences), in the East Building (electronic radiology) and in the Scott Avenue Imaging Center (neurological PET, molecular pharmacology, MR imaging, optical imaging and cardiovascular imaging).

Administrative, teaching and support functions occupy the sixth floor and the ninth through the 12th floors of the Institute.

The Mallinckrodt Institute of Radiology at Washington University Imaging Center is an extension of the medical school campus East Building. Opened in November 1994, the Imaging Center's 70,000 square feet of space is dedicated to PET, MR and related sciences research. One of the best-equipped multidisciplinary facilities worldwide, the Imaging Center provides centralized resources for the scientific evaluation of imaging technology and for the development and application of advanced imaging systems. Researchers have access to advanced PET systems; six magnetic resonance scanners; three medical cyclotrons; in vivo MR spectroscopy; laboratories; animal care facilities; a neuropsychology laboratory; electrical engineering laboratories for image reconstruction; and high-end graphics workstations. The Imaging Center also houses sophisticated computer facilities that are used for clinical, research and teaching applications.

## **Courses**

### ***First Year***

During the first semester of the gross anatomy course, conferences are given by several members of the radiology staff in the following areas: neuro, chest, cardiac, musculoskeletal and abdominal radiology. These sessions are arranged to coincide with the particular area of the body being studied in the anatomical dissection classes. Conferences are conducted in small groups, giving students an opportunity to relate directly with the radiologists.

### **Selectives**

#### **M04 501 ANATOMY THROUGH THE EYES OF THE RADIOLOGIST**

Coordinator: Pam Schaub, 362-2928

A five-week seminar that seeks to reinforce the first- semester anatomy experience by relating previously learned anatomical information to radiographic images. As a byproduct, this elective provides a link for the first-year anatomists to the real world of medicine. Students will be expected to work in small groups prior to the meeting of each seminar to review a set of radiographic images and/or review recommended reading. Groups assigned a case will be responsible for presenting their findings to the class. Radiologists from radiology subspecialties will moderate the conference and supply appropriate complementary cases as needed. Harvey S. Glazer, M.D.

## **Second Year**

Twelve hours of lecture are devoted to an introduction to radiology. The majority of the course is devoted to diagnostic radiology, including computed tomography, ultrasound, nuclear medicine and magnetic resonance. Radiation biology also is introduced. The course also includes review of individual teaching file cases at small group sessions. Harvey S. Glazer, M.D.

## **Fourth Year**

### **Electives**

#### **M90 808 BODY CT**

Instructor(s): Fernando R. Gutierrez, M.D., and Sanjeev Bhalla, M.D., 362-2927

Location: Mallinckrodt Institute of Radiology

Elective Contact: Fernando R. Gutierrez, M.D., and Sanjeev Bhalla, M.D., 362-2927

Other Information: Students should contact Drs. Gutierrez or Bhalla to discuss meeting location and time for first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students will work with two attendings and four residents and participate in all aspects of the Body CT service including interview of patients, protocoling examinations, review and interpretation of diagnostic CT examination and consultation with referring physicians. Approximately 400 CTs are performed each week including chest, abdominal and pelvic examinations and biopsy procedures. Students will attend the daily CT teaching conference and have the opportunity to attend other lectures and conferences. Special interests can be accommodated.

Student time distribution: Inpatient 30%, Outpatient 50%, Conferences/ Lectures 20%; Primary Care 50%, Subspecialty care 50%

Major teaching responsibility: Attending physician and residents

Patients seen/weekly: N/A

On call/weekend responsibility: None

#### **M90 815 EMERGENCY RADIOLOGIC IMAGING**

Instructor(s): Sanjeev Bhalla, M.D., 362-2927

Location: Emergency Department,  
Southwest Tower

Elective Contact: Sanjeev Bhalla, M.D., 362-2927

Other Information: Students should contact Dr. Bhalla to discuss meeting location and time for first day of elective and to obtain reading list.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

A four-week elective emphasizing the interactions between radiologists and emergency department physicians. Students will have extensive exposure to evaluation of both medical and surgical emergencies in the adult patient. They will learn appropriate utilization of radiologic resources, and will also learn the basics of film reading (chest, bone and joint, and body CT) at the viewing console. Students will serve as a liaison with the clinical physicians and support staff. This active elective will include attendance at the daily radiologic emergency department conference.

Student time distribution: Inpatient (ER) 80%, Conferences/Lectures 20%

Major teaching responsibility: Attendings and residents on the ER radiology service

Patients seen/weekly: 250 chest radiographs, 100 bone and joint, 40 CT exams

On call/weekend responsibility: None

#### **M90 820 CLINICAL NUCLEAR MEDICINE**

Instructor(s): Tom R. Miller, M.D., Ph.D., 362-2809

Location: 956 West Pavilion

Elective Contact: Tom R. Miller, M.D., Ph.D., 362-2809

Other Information: Students report to 956 West Pavilion, 8:30 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The student will be exposed to the full range of clinical nuclear medicine. In conjunction with the staff, the student will be responsible for planning and interpreting imaging studies in patients referred to the Department. Opportunity exists to learn instrumentation techniques, including computer applications. There are daily conferences and scan interpretation sessions.

Student time distribution: Inpatient 30%, Outpatient 50%, Conferences/ Lectures 20%; Primary Care 50%, Subspecialty Care 50%

Major teaching responsibility: Multiple attendings and fellows

Patients seen/weekly: 200

On call/weekend responsibility: None

#### M90 830 INTERVENTIONAL RADIOLOGY

Instructor(s): Jennifer Gould, M.D., 362-2900

Location: Mallinckrodt Institute of Radiology

Elective Contact: Jennifer Gould, M.D., 362-2900

Other Information: Students should contact Dr. Gould to discuss meeting location and time for first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students will be exposed to all clinical and procedural aspects of interventional radiology including: patient evaluation and consultation, preparation of patients for procedures, performance of a wide range of vascular and non-vascular procedures, post-procedure patient management, and longitudinal patient follow-up. Students will actively participate in interventional procedures. Students will attend the departmental noon conference (daily) and section conferences including didactic lectures, morbidity and mortality conference, and case conferences (3-4 times per week).

Student time distribution: Inpatient 80%, Outpatient 10%, Conferences 10%

Major teaching responsibility: Attending Interventional radiology physicians will provide the majority of teaching. Fellows and residents will provide additional teaching.

Patients seen/weekly: Approximately 150 patients per week are seen in consultation or for procedures in the south campus Interventional facility.

On call/weekend responsibility: None

#### M90 842 THORACIC IMAGING -- MIR

Instructor(s): Harvey Glazer, M.D., 362-2927

Location: Mallinckrodt Institute of Radiology

Elective Contact: Harvey Glazer, 362-2927

Other Information: Students meet instructor at 7:00 a.m. in the chest reading room, 2nd Floor, Mallinckrodt Institute of Radiology.

Enrollment limit per period: 3

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

A four-week elective emphasizing the interactions between chest radiologists and the various clinical services, to include thoracic surgery, thoracic oncology, and pulmonary medicine. Learn to read chest radiographs at the viewing console while providing liaison with the clinical teams. This active elective will include the daily chest teaching conference and participation in weekly autopsy, thoracic surgery, thoracic oncology conferences, as well as the imaging aspects of the clinico-pathological medicine conference. Learn to identify subtle pneumothorax and pneumonia. Learn the limitations of portable chest radiographs.

Student time distribution: Inpatient 40%, Outpatient 35%, Conferences/ Lectures 25%

Major teaching responsibility: Attendings and residents on chest radiology service

Patients seen/weekly: 500 CXRs seen weekly

On call/weekend responsibility: None

## Research

### **(M90 900)**

Interested students should contact the appropriate individual in each division regarding the types of research projects available.

Kyongtae Ty Bae, M.D., Ph.D., Room 3350 East Building, 747-1733. Quantitative Imaging Analysis. My research interests are quantitative and physiologic imaging and computer applications in diagnostic imaging. Radiology is a fast growing medical specialty. Rapid developments in computer and technology have provided an opportunity to explore for new radiology and clinical application and to use imaging as a quantification tool. Ongoing research projects include image segmentation and processing, computer-aided diagnosis, contrast medium pharmacokinetics, and functional and physiologic CT and MRI imaging.

Tom Conturo, M.D., Ph.D., 2nd Floor East Building, 362-8421. My research group's interests include magnetic resonance (MR) technique development and experimental studies involving cerebral perfusion and diffusion imaging, including neuronal fiber tracking in the human brain, MR imaging of brain functional activation, and development of MR contrast agents.

Farrokh Dehdashti, M.D., Nuclear Medicine PET Facility, 7th Floor Mallinckrodt Institute of Radiology, 362-7418. Positron emission tomography (PET) is an imaging technique that produces images reflective of biochemical processes of normal and abnormal tissues. PET is complementary to anatomic imaging modalities such as computed tomography (CT) and magnetic resonance imaging (MRI). The ability of PET to quantify the fundamental processes, such as blood flow, oxygen metabolism, glucose metabolism, and receptor density, makes this technique very desirable to both investigators and clinicians. Dr. Dehdashti's research utilizes the conventional PET radiopharmaceutical, F-18 fluorodeoxyglucose (FDG), as well as a variety of unique PET radiopharmaceuticals such as 16a[ 18 F]-fluoro-17b-estradiol (FES), an estrogen receptor based imaging tracer, Cu-60-diacetyl-bis[N 4 -methylthiosemicarbazone (Cu-60 ATSM), a hypoxic imaging tracer, 16b-[ 18F]-fluoro-5a-dihydrotestosterone (FDHT), an androgen receptor based imaging tracer, and 94mTc-sestamibi to assess the functional capacity of multidrug drug resistance. Below is a partial list of the research projects relating to PET: (1) PET assessment of response to hormone therapy in advanced hormone-sensitive breast cancer (the major goal of this project is to predict response to hormone therapy in breast cancer based on PET assessment of flare reaction); (2) Imaging MDR1 P-glycoprotein transport activity in vivo with 94mTc-sestamibi PET to predict response to chemotherapy (the major goal of this project is to assess whether 94mTc-sestamibi PET will provide a functional assessment of MDR1 Pgp in advanced lung cancer and whether tumor uptake of 94m Tc-sestamibi prior to chemotherapy will predict treatment failure in these patients); (3) PET assessment of tumor hypoxia using Cu-ATSM in patients with rectal cancer (the major goal of this project is to predict response to neoadjuvant therapy); (4) PET assessment of tumor hypoxia using Cu-ATSM in patients with breast cancer (the major goal of this project is to predict prognosis and response to neoadjuvant chemotherapy); (5) Functional assessment of P-glycoprotein with conventional nuclear medicine imaging and 99mTc-sestamibi in patients with advanced breast cancer; (6) PET assessment of prostate cancer using C-11 acetate.

Rob J. Gropler, M.D., Room 1307 East Building, 747-3878. Cardiovascular Imaging Research. The research in the Cardiovascular Imaging Laboratory is designed to better understand the relationship between myocardial perfusion, intermediary metabolism and mechanical function in both normal and abnormal cardiac states. The research involves the integration of several imaging techniques with diverse strengths such as PET, MRI, CT and echocardiography. The success of the research requires several paths of investigation to be pursued in parallel. For example, in order to image the biologic processes of interest requires continued technical developments for each of the imaging methods listed above. There are ongoing efforts to permit more accurate PET measurements of myocardial substrate metabolism. They include the development of novel tracers of extracted substrates, the development of acquisition schemes to assess endogenous substrate metabolism, and the validation of mathematical approaches to correlate the tracer kinetics with the underlying metabolic processes. These studies are being pursued in small and large animal models and then in humans. Another example includes the current efforts to develop approaches to image the coronary arteries non-invasively by MRI using novel contrast agents and acquisition schemes. In addition, techniques are being developed to permit MR guided interventions on the coronary arteries. This undertaking includes the development of novel guide-wire tracking and catheter tracking schemes using both passive and active approaches. Finally, to permit assessments of myocardial oxygenation and thus, perfusion, techniques are being developed to permit BOLD imaging the myocardium. Another path of the research is to determine how this perfusional-metabolic-functional relation is altered by normal life changes and then determine how disease states alter the relationship. For example, both PET and echocardiography are being used to characterize the age and gender related changes on myocardial perfusion, substrate metabolism and function. To study the relationship in disease states, similar studies are being performed in patients with diabetes and obesity. A third path to determine the



mechanisms responsible for these changes in this metabolic-functional relation and identify potential interventions that may reverse or ameliorate them. In this regard, similar imaging studies are being performed to determine the importance of nitric oxide and the PPAR $\alpha$  system in defining this metabolic-functional relation.

Charles Hildebolt, D.D.S., Ph.D., 3rd Floor East Building, 362-8410. The assessment of oral bone by digital radiographic imaging, including new assessment methods based on photostimulable phosphor radiography. Assessments are focused on the use of radiographic imaging of oral bone to determine osteoporosis risk and the association between oral bone mass and dietary intake of calcium and vitamin D.

Tom R. Miller, M.D., Ph.D., 9th Floor West Pavilion, 362-2809. Research projects are available in positron emission tomography (PET) in the following areas: (1) Use of PET in radiation therapy treatment planning in patients with cervical cancer; (2) Evaluation of prognosis in cervical cancer by quantitative measures of tumor size, uptake and heterogeneity; (3) Evaluation of new radiopharmaceuticals in prostate cancer.

Mark A. Mintun, M.D., Suite 3354 East Building, 362-3316/362-6965. Positron Emission Tomography (PET). We use positron emission tomography (PET) in human subjects as a tool in the investigation of two distinct areas: The first area of research involves the study of the metabolic needs of the brain during neural work. While cerebral blood flow (CBF) augmentation is considered to be a hallmark of intensified neural activity, recent data from our laboratory have shown that in healthy human subjects the CBF response to physiological stimulation is not altered by stepped hypoglycemia or hypoxia and is driven by factors other than local requirements in glucose or oxygen. Theoretical modeling of oxygen delivery to human brain and actual measurements in healthy humans showed that adequate tissue levels of oxygen could be maintained without the need for increased CBF or oxygen delivery. Brain oxygen utilization increases during continuous physiological stimulation. The time course and magnitude of these changes suggest that the energy demands of neuronal activation are initially met predominantly by increased glycolysis whereas continued neuronal activation eventually requires increased oxidative metabolism. We suggest that the redox potential of the neural cells (NADH/NAD $^{+}$  or lactate/pyruvate ratio) is an important sensor of blood flow need. This hypothesis was supported by the data obtained in animals and humans with CBF activation studies with lactate and pyruvate injections.

A second area of our research involves the use of PET to study the biology of depression treatment as well as other related neuropsychiatric diseases. The current interest in the laboratory is the use of serotonergic measures to probe the changes in brain receptor function during treatment of depression with different antidepressant drugs. We have previously shown with PET that the serotonin system in untreated depressed patients has decreased responsiveness to pharmacological challenge. Recently we have shown that, using the highly selective radioligand [18F]-altanserin to image serotonin-2A receptors *in vivo*, depressed patients have substantially decreased serotonin-2A receptors in the hippocampus compared to normal control subjects. The effect of antidepressant treatment on receptor density is being studied in order to study the responsiveness and down-regulation of this system. Other ongoing research has focused on the biology of addiction and involves the imaging of dopamine receptors in the basal ganglia, measuring the release of dopamine after pharmacologic challenges, and the measure of GABA-A receptors in different patient populations.

Stephen M. Moerlein, Ph.D., Radiological Sciences, 362-8466. Research interests lie in the general area of labeled tracer development for nuclear medicine imaging, especially positron-emission tomography (PET). Developmental effort begins with synthesis of target structures, preclinical screening that involves *in vitro* biochemistry and pharmacological testing, and *ex vivo* biodistribution studies in small animals. Promising tracers are then examined by *in vivo* imaging of animal subjects and tracer kinetic modeling. The final step in the transition of a radiochemical into a labeled drug takes into account radiation dosimetry, pharmaceutical quality, and the development of automated production to streamline delivery to human subjects. Each of these aspects are researched, with a primary interest in novel agents for examination of neurological processes by PET.

David Piwnica-Worms, M.D., Ph.D., 3rd Floor East Building, 362-9356. Research projects in molecular imaging are available. Molecular imaging is broadly defined as the characterization and measurement of biological processes in living animals, model systems and humans at the molecular and cellular level using remote imaging detectors such as PET, SPECT, MRI, bioluminescence, and near-infrared fluorescence. Our goal is to advance the understanding of normal biology and pathophysiology through noninvasive investigation of molecular and cellular events *in vivo*. Projects focus on validation and use of PET reporter genes and PET reporter probes as well as luciferase and bioluminescence imaging to investigate protein-protein interactions, gene expression patterns in cancer and infectious

disease, development of peptide conjugates for membrane transduction of PET, SPECT and MR contrast agents, and investigations of the transport functions of the multidrug resistance (MDR1) P-glycoprotein family of membrane transporters.

William J. Powers, M.D., 2nd Floor East Building, 362-2957. Research opportunities are available using positron emission tomography to measure cerebral blood flow and metabolism in human subjects to investigate how the blood borne supply of oxygen and glucose is regulated to energy demand in physiological and pathological conditions. Ongoing projects include studies of cerebrovascular disease, head trauma, Huntington's disease and Parkinson's disease.

Marc Raichle, M.D., 2nd Floor East Building, 362-6907. We use functional imaging techniques, both positron emission tomography and functional magnetic resonance imaging, to study the normal organization of the human brain and the effect of selected diseases. The research focuses on both the methodology (imaging and experimental) and specific questions in cognitive neuroscience.

Michael J. Welch, Ph.D., 4th Floor Clinical Sciences Research Building, 362-8435. Short-lived positron emitting radionuclides such as carbon-11 and fluorine-18 can be used to trace physiologic and pharmacologic processes in humans. Tracers are being developed to probe brain receptors, tumor receptors and enzyme systems.

Bruce R. Whiting, Ph.D., Room 3352, East Building, 362-6965. Quantitative Computed Tomography (CT). By developing accurate models of the physics of CT image acquisition and incorporating these models into image reconstruction algorithms, improved quantitative information can be obtained from clinical CT images. Applications include 3D localization of cochlear implants, protocols to minimize CT radiation dose, brachytherapy dose planning, and alveolar bone structure. There are opportunities for computer programming and algorithm development, experimental data collection, conducting observer studies and analyzing clinical patient data.

## Faculty

**R. GILBERT JOST, MD** Elizabeth E Mallinckrodt Professor of Radiology, Head of The Department of Radiology, Director of The Edward Mallinckrodt Institute of Radiology

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**DAVID GERARD POLITTE, D SC** Research Instructor in Radiology  
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## **Department's Website**

<http://www.mir.wustl.edu/>

## **Department of Surgery**

The Department of Surgery includes the Divisions of General Surgery, Cardiothoracic Surgery, Pediatric Surgery, Plastic Surgery and Urologic Surgery. The formal instruction begins in the third year. For the duration of the 12-week rotation in Surgery, students are assigned clinical rotations, both within the Department of Surgery and in other departments at the School of Medicine, in which they have the opportunity to participate in the care of surgical patients. Students attend daily patient rounds and outpatient clinics as well as scheduled and emergency surgical procedures. Seminars and teaching conferences are scheduled on a regular basis. In the fourth year, students may select a subinternship elective offered through the various services within the Division of General Surgery. In addition, within the Department of Surgery, electives are available in pediatric surgery, transplant surgery, vascular surgery, cardiovascular and thoracic surgery, urologic surgery, and plastic and reconstructive surgery.

## **Courses**

### ***Third Year***

#### **M95 790 INTEGRATED SURGICAL DISCIPLINES CLERKSHIP**

During the 12-week surgery clerkship, students are assigned to three separate rotations. Each student is assigned to a required general surgery rotation at Barnes-Jewish Hospital, Christian Northeast Hospital, or the Veterans Administration Medical Center. In addition, each student selects elective rotations in other general surgical fields, surgical subspecialties and related disciplines of critical care. The student is an active participant in the daily care of patients on each service and attends the

service teaching conferences and rounds. For the duration of the 12-week rotation, there are weekly small-group tutorial sessions with faculty members and a biweekly lecture series.

## **Fourth Year**

There is ample opportunity for fourth-year students to participate in elective rotations within each Division of the Department of Surgery. Many of the fourth-year surgery electives are structured to allow the student to participate as a "sub-intern," facilitating experiences in preoperative, intraoperative and postoperative patient management. Generally, the minimum duration of a fourth-year elective rotation in the Department of Surgery is four weeks. Research electives are also available.

### **Electives**

#### **M95 863 ACTING INTERNSHIP, SURGICAL ONCOLOGY AND ENDOCRINE SURGERY**

Instructor(s): Timothy Eberlein, M.D.; Jeffrey Moley, M.D.; Rebecca Aft, M.D.; L. Michael Brunt, M.D.; Jill Dietz, M.D.; Virginia Herrmann, M.D.; Terry Lairmore, M.D.; and Jerome Levy, M.D.

Location: 3rd Floor Kingshighway Bldg.

Elective Contact: Jackie Fleming, 362-8029

Other Information: This is NOT a "preceptor" elective. However, students may elect to make prior arrangements to work more closely with a specific attending (based on availability).

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This subinternship elective is designed to give students in-depth experience in the clinical management of patients on the Endocrine and Surgical Oncology Service (Unit I Service). Students will serve as clerks and will be responsible for patient management with housestaff under the guidance of the chief resident and attending surgeons. Clinical exposure is focused on thyroid, parathyroid and adrenal surgery, as well as breast oncology, GI oncology, melanoma and soft-tissue sarcomas. The course will offer opportunities for students to gain experience in preoperative, intraoperative, and postoperative patient management. There will be opportunity for students to evaluate patients, decide on a diagnostic and management strategy and provide care under housestaff and faculty guidance, as well as ample opportunity to attend and participate in conferences. Note: If a student desires to work more closely with a "specific attending," he/she must make special arrangements with the faculty member prior to beginning this elective. If you have any questions regarding this notice, please call Jackie Fleming in the Surgical Education Office (362-8029).

Student time distribution: Inpatient 75%, Outpatient 15%, Conferences/ Lectures 10%; Primary Care 100%

Major teaching responsibility: Attending, chief resident, and junior residents

Patients seen/weekly: 20-40 (varies)

On call/weekend responsibility: Every third or fourth night with a resident who will directly supervise

#### **M95 879 ACTING INTERNSHIP, HEPATOBILIARY PANCREATIC SURGERY**

Instructor(s): Steven Strasberg, M.D., and David Linehan, M.D., 362-7147

Location: 17308 West Pavilion

Elective Contact: Jackie Fleming, 362-8029

Other Information: This is NOT a "preceptor" elective. However, students may elect to make prior arrangements to work more closely with a specific attending on this service (based on availability).

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This subinternship elective is designed to give students in-depth experience in the clinical management of patients on the Hepatobiliary/Pancreatic (Unit II) Service. The Unit II Service is a busy upper gastrointestinal service with a focus on hepatobiliary and pancreatic diseases and their treatment. The course will offer opportunities for students to gain experience in preoperative, intraoperative and postoperative, patient management. Students will serve as clerks and will be responsible for patient management with housestaff under the guidance of the chief resident and attending surgeons. There will be opportunity for students to evaluate patients, decide on a diagnostic and management strategy and provide care under housestaff and faculty guidance, as well as ample opportunity to attend and participate in conferences. Note: If a student desires to work more closely with a "specific attending," he/she must make special arrangements with the faculty member prior to

beginning this elective. If you have any questions regarding this notice, please call Jackie Fleming in the Surgical Education Office (362-8029).

Student time distribution: Inpatient 75%, Outpatient 15%, Conferences/ Lectures 10%; Primary Care 100%

Major teaching responsibility: Attending, chief resident, and junior residents

Patients seen/weekly: Varies

On call/weekend responsibility: Every third or fourth night with a resident who will directly supervise

#### M95 814 ACTING INTERNSHIP, TRAUMA SERVICE

Instructor(s): Timothy G. Buchman, Ph.D., M.D.; Bradley Freeman, M.D.; Douglas Schuerer, M.D.; and Robb Whinney, O.D.

Location: 6104 Queeny Tower

Elective Contact: Vicki Amelung, 362-9347

Other Information: This is NOT a "preceptor" elective. However, students may elect to make prior arrangements to work more closely with particular attendings on this service (based on availability).

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The student on this elective will function as a subintern on the Trauma and Emergency Service within the Section of Burns, Trauma, and Surgical Critical Care. Student involvement in all aspects of clinical surgery is accomplished by student attendance in the outpatient office, preoperative patient evaluation, in-hospital patient management and postoperative outpatient follow-up after discharge. Practical experience will focus on the initial evaluation and resuscitation of traumatized patients and other emergency care patients. The student will also participate in regular rounds, conferences, and in-house call. Note: If a student desires to work more closely with a "specific attending," he/she must make special arrangements with the faculty member prior to beginning this elective. If you have any questions regarding this notice, please call Jackie Fleming in the Surgical Education Office (362-8029). Student time distribution: Inpatient 80%, Outpatient 10%, Conferences/ Lectures 10%; Primary Care 20%, Subspecialty Care 80%

Major teaching responsibility: Attendings, residents and fellows

Patients seen/weekly: 30

On call/weekend responsibility: Yes

#### M95 893

##### ACTING INTERNSHIP, MINIMALLY INVASIVE SURGERY

Instructor(s): L. Michael Brunt, M.D., and Mary L. Klingensmith, M.D., 454-7194

Location: Room 3503 Kingshighway Building, Barnes-Jewish Hospital, North Campus

Elective Contact: Student should contact Dr. Brunt at 454-7194 prior to the first day of the elective

Other Information: This is NOT a "preceptor" elective. However, students may elect to make prior arrangements to work more closely with Dr. Brunt on this elective (based on availability).

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This subinternship elective in minimally invasive surgery is offered by L. Michael Brunt, M.D., a member of the Endocrine and Oncologic Surgery Section of the General Surgery Division. Surgeons in the Minimally Invasive Surgery group regularly perform the following procedures laparoscopically: cholecystectomy, splenectomy, adrenalectomy, gastric fundoplication, inguinal hernia repair, and gastric bypass for morbid obesity. The medical student electing this rotation will participate in the outpatient office and direct patient care, assist and observe in a wide range of laparoscopic procedures and participate in teaching rounds and conferences. During this rotation, the student may also have the opportunity to observe and participate in minimally invasive surgical procedures performed by various surgeons within the Division of General Surgery. Additionally, the student may also elect to participate in the laboratory of the Washington University Institute for Minimally Invasive Surgery one or two days per week. Notice: If a student desires to work more closely with a "specific attending," he/she must make special arrangements with the faculty member prior to beginning this elective. If you have any questions regarding this notice, please call Jackie Fleming in the Surgical Education Office (362-8029).

Student time distribution: Inpatient 60%, Outpatient 30%, Conferences/ Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attending and residents

Patients seen/weekly: ~25 (varies)



On call/weekend responsibility: None

#### M95 871 ACTING INTERNSHIP, VASCULAR SURGERY

Instructor(s): Gregorio Sicard, M.D.; Brian Rubin, M.D.; M. Wayne Flye, M.D.; Eric Choi, M.D.; Patrick Geraghty, M.D.; and Luis Sanchez, M.D., 362-7841

Location: 5103 Queeny Tower

Elective Contact: Students should contact Debbie Swap in Dr. Sicard's office prior to the start of this rotation at 362-7841

Other Information: This is NOT a "preceptor" elective. However, students may elect to make prior arrangements to work more closely with Dr. Sicard (362-7841) or other attendings on this service (based on availability).

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This subinternship elective is designed to give students in-depth experience in the clinical management of patients on the Vascular Surgery Service. The elective will offer opportunities for students to gain experience in preoperative, intraoperative and postoperative, management of patients with surgically treated vascular diseases/conditions. Students will serve as clerks and will be responsible for patient management with housestaff under the guidance of the chief resident and attending surgeons. There will be opportunity for students to evaluate patients, decide on a diagnostic and management strategy and provide care under housestaff and faculty guidance, as well as ample opportunity to attend and participate in conferences. Notice: If a student desires to work more closely with a "specific attending," he/she must make special arrangements with the faculty member prior to beginning this elective. If you have any questions regarding this notice, please call Jackie Fleming in the Surgical Education Office (362-8029).

Student time distribution: Inpatient 70%, Outpatient 20%, Conferences/ Lectures 10%; Primary Care 10%, Subspecialty Care 90%

Major teaching responsibility: Attending, fellows, chief resident, and junior residents

Patients seen/weekly: 100+ (varies)

On call/weekend responsibility: Student's option

#### M95 862 ACTING INTERNSHIP, COLON AND RECTAL SURGERY

Instructor(s): James W. Fleshman, M.D.; Elisa Birnbaum, M.D.; David Dietz, M.D.; and Matthew Mutch, M.D.

Location: 14102 Queeny Tower, South Campus

Elective Contact: Liz Nordike, 454-7183

Other Information: This is NOT a "preceptor" elective. However, students may elect to make prior arrangements to work more closely with a specific attending on this elective (based on availability).

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This subinternship elective is designed to give students in-depth experience in the clinical management of patients on the Colorectal Surgery Service. Students work closely with the attendings within the Section of Colon and Rectal Surgery, and clinical exposure is focused on a wide range of benign and malignant colorectal diseases. There is exposure to radiation oncology and the specialized areas of nursing related to care of patients with colorectal cancer and inflammatory bowel disease. The course will offer opportunities for students to gain experience in preoperative, intraoperative and postoperative, patient management under housestaff and faculty guidance, as well as ample opportunity to attend and participate in conferences. Notice: If a student desires to work more closely with a "specific attending," he/she must make special arrangements with the Colorectal Surgery Office prior to beginning this elective.

Student time distribution: Inpatient 75%, Outpatient 20%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: James W. Fleshman, M.D.; David Dietz, M.D.; and colorectal fellows

Patients seen/weekly: 25-50

On call/weekend responsibility: Every fifth night or negotiable

#### M95 891 ORGAN TRANSPLANTATION

Instructor(s): Surendra Shenoy, M.D., Ph.D. and Martin Jendrisak, M.D., 362-5701; William Chapman, M.D., 362-7792; Niraj Desai, M.D., 747-1393; and Jeffrey Lowell, M.D., 362-2820

Location: Barnes-Jewish Hospital  
Elective Contact: Dr. Shenoy's secretary (362-4338)  
Other Information: Student should contact instructor if interested in scheduling elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The care of transplant patients requires the integration of multiple diverse medical and surgical disciplines. This elective clerkship in organ transplantation encompasses the preoperative evaluation and management of adult and pediatric recipients of liver, kidney and pancreas. Students participate in procurement of allografts from cadaveric or living donors, organ preservation and transplantation. Emphasis is also placed on postoperative care, multimodality immunosuppression and management of allograft rejection. Basic hepatic and renal physiology, fluid and electrolyte balance, and transplantation immunology are stressed. Rotation provides an elaborate exposure to different facets of management of end stage renal and liver disease. Management of the complications of diabetes, hypertension, portal hypertension and infectious problems are an integral part of pre and post transplant care. This course is designed to offer the student an overview of the field of organ transplantation. The student functions as a member of the transplant team and assumes appropriate responsibilities under supervision.

Student time distribution: Inpatient 80%, Outpatient 10%, Conferences/ Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Full attending and resident staff

Patients seen/weekly: 40

On call/weekend responsibility: Yes

#### M95 820 CARDIOTHORACIC SURGERY

Instructor(s): Joel D. Cooper, M.D.; Richard Battafarano, M.D.; Ralph Damiano, M.D.; William A. Gay, M.D.; Charles B. Huddleston, M.D.; Jennifer Lawton, M.D.; Bryan Meyers, M.D.; Nader Moazami, M.D.; Marc Moon, M.D.; Michael K. Pasque, M.D.; G. Alexander Patterson, M.D.; Charl DeWet, M.D.; Lauren Hill, M.D.; and Eric Jacobsohn, M.D.

Location: 3106 Queeny Tower

Elective Contact: Jennifer Lawton, M.D. (Secretary: Beverly Wolff 362-2821)

Other Information: Students should contact Beverly Wolff at 362-2821 prior to the first day of elective. Students should report to 3106 Queeny Tower, 8:30 a.m. first day of elective.

Enrollment limit per period: 3

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The senior elective in cardiothoracic surgery is a four-week clinical rotation with two week blocks divided between adult cardiac, pediatric cardiac, and general thoracic surgery according to the student's preference. Students will participate in morning work rounds, attend the operative procedures of their choice, and attend weekly conferences and teaching rounds. Students will be introduced not only to the surgical procedures but also to the postoperative care of the surgical patients.

On the pediatric and adult cardiac services, students will be introduced to the principles of cardiopulmonary bypass, ventricular assist devices, cardiac transplantation, coronary artery bypass surgery (on and off pump), valve repair and replacement, complex aortic surgery, the MAZE procedures and others.

On the adult cardiac surgery service, students will function as subinterns under the direct supervision of a faculty member.

On the thoracic surgical rotation students will have the opportunity of performing bronchoscopy, esophagoscopy, gastroscopy, and participate in surgical resections of lung cancer and esophageal cancer, as well as surgery for emphysema and for benign esophageal conditions. Students will also participate in lung transplantation surgery.

Student time distribution: Inpatient 80%, Outpatient 10%, Conferences/ Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attendings and residents

Patients seen/weekly: 20

On call/weekend responsibility: One in three, no weekend call

#### M95 830 PLASTIC RECONSTRUCTIVE SURGERY

Instructor(s): Thomas Tung, M.D., 362-4588

Location: East Pavilion

Elective Contact: Thomas Tung, M.D., 362-4588

Other Information: Students should meet in 17424 East Pavilion, 8:30 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The period on plastic surgery may either be spent as a clinical clerkship or conducting a basic laboratory project. The purpose of the clinical clerkship is to familiarize the student with the basic principles of tissue repair and reconstruction. The student will have successive assignments to each of the attending staff and the ward resident during the four weeks. This will expose the student to the breadth and depth of plastic surgery. Alternatively, if the student has identified a focus of interest, the student may participate on those services of special interest, such as hand or pediatric plastic surgery. The student will assume an active role on the plastic surgery service and will participate in the total management of a wide variety of surgical problems including congenital anomalies, microvascular surgery, surgery of the upper extremity, peripheral nerve surgery, cosmetic surgery and general reconstructive plastic surgery.

Student time distribution: Inpatient 70%, Outpatient 20%, Conferences/ Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attendings and residents

Patients seen/weekly: 12

On call/weekend responsibility: Recommended

#### M95 831 PLASTIC SURGERY AMBULATORY CARE

Instructor(s): Thomas Tung, M.D., 362-4588

Location: East Pavilion

Elective Contact: Thomas Tung, M.D., 362-4588

Other Information: Students should meet in 17424 East Pavilion, 8:30 a.m. first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The period on plastic surgery ambulatory care will focus on outpatient management of hand fractures, nerve injuries, facial traumas, wound healing/repair, pediatric injury, skin lesions and general outpatient plastic surgery. This rotation will focus on teaching basic suturing, radiology related duties, casting and splinting.

Student time distribution: Outpatient 90%, Conferences/Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attendings and residents

Patients seen/weekly: 150

On call/weekend responsibility: Recommended

#### M95 850 UROLOGY

Instructor(s): Gerald Andriole, M.D., 362-8212

Location: Wohl Hospital

Elective Contact: Sally Wahlbrink, 362-8212

Other Information: Students should contact Dr. Andriole's office at 362-8212 prior to first day for room assignment.

Enrollment limit per period: minimum 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

A four-week clinical clerkship in pediatric and/or adult urology will offer the interested student experience with a spectrum of problems in clinical urology. The student will learn the basic diagnostic procedures and management of surgical and non-surgical aspects of patient care on the private and ward services under the supervision of the attending staff and house staff. Clinical conferences are held four days per week.

Student time distribution: Inpatient 80%, Outpatient 10%, Conferences/ Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Several attendings, chief resident, and resident staff

Patients seen/weekly: >20

On call/weekend responsibility: None

#### M95 880 PEDIATRIC SURGERY

Instructor(s): Robert Foglia, M.D., 454-6022

Location: 5S60 St. Louis Children's Hospital

Elective Contact: Donna Theiss, 454-6022

Other Information: Students should report at 8:30 a.m. on the first day of the rotation. Call Dr. Foglia's office for location.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The student will fully participate as a subintern in all aspects of pediatric surgical patient care, including preoperative evaluation, surgery and postoperative care. Twice-daily rounds are made with the resident staff and daily rounds with the attending staff. Participation in general surgery pediatric clinic and emergency room care. Conferences include mortality and morbidity, radiology, pathology, trauma, case presentations and basic science, as well as daily contact with pediatric radiology, are expected. Students are encouraged to undertake clinical investigations if they have an interest. Student time distribution: Inpatient 60%, Outpatient 30%, Conferences/ Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attendings

Patients seen/weekly: 35

On call/weekend responsibility: Optional

M95 807 SURGERY CLERKSHIP, GENERAL SURGERY -- KEOKUK AREA HOSPITAL (Rural Practice)

Instructor(s): Philip Caropreso, M.D., (319) 524-6365

Location: Keokuk Area Hospital

Elective Contact: Philip Caropreso, M.D., (319) 526-6365

Other Information: Students report to Dr. Caropreso's office, Surgical Specialists of Keokuk, 1425 Morgan St., Keokuk, Iowa, 9:00 a.m. first day of elective.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students work under the supervision of two general surgeons involved in a rural practice at the Keokuk Area Hospital, Keokuk, Iowa. Students function under a preceptorship arrangement and are involved in the diagnosis and management of a large variety of patients with general surgery conditions. Patients are followed from their initial office visit through outpatient diagnostic procedures and on to hospital admission for operation. Students assist or participate in surgery as first assistants, perform some minor surgeries under supervision, and have frequent opportunities to gain experience in a variety of endoscopic procedures. Students are an integral part of the practice of the two general surgeons. Housing is provided across the street from the hospital and food maintenance covered by the hospital. Keokuk is located approximately 3.5 hours north of St. Louis and is accessible by car. Student time distribution: Inpatient 50%, Outpatient 50%; Subspecialty Care (General Surgery) 100%

Major teaching responsibility: Attending surgeons in general surgical partnership

Patients seen/weekly: 15-20

On call/weekend responsibility: On call weekdays/weekend optional

M10 820 CRITICAL CARE

Instructor(s): Timothy G. Buchman, Ph.D., M.D., 362-9347; Walter Boyle, M.D.; J. Perren Cobb, M.D.; Craig Coopersmith, M.D.; Alex Evers, M.D.; Eric Jacobsohn, M.D.; Laureen Hill, M.D.; Richard Hotchkiss, M.D.; George Tseng, M.D.; Omokhayo Higo, M.D.; John Mazuski, M.D.; and Doug Schuerer, M.D.

Location: Barnes-Jewish Hospital, South Campus

Elective Contact: Vicki Amelung, 362-9347

Other Information: Students should meet in Surgical Intensive Care Unit, 7:00 a.m. first day of elective.

Enrollment limit per period: 4

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This clinical elective is designated to familiarize the student with the management of the critically ill patient. The setting is the 8400 surgical intensive care unit at Barnes-Jewish Hospital. The student will receive individualized training in critical care management including stabilization of the critically ill or injured patient, cardiovascular assessment and invasive hemodynamic monitoring, management of the airway and mechanical ventilator support, and other aggressive support as needed. The student

will function as an integral member of the surgical intensive care unit team, which consists of physicians with specialty training in critical care, critical care fellows, house staff from surgery, anesthesiology, and other specialties, pharmacists, and nutrition experts. The student will actively participate in daily rounds with members of the team and will be actively involved in the management of critically ill patients from all the surgical specialties except cardiothoracic and neurosurgery. Practical experience will be gained in placement and interpretation of invasive and non-invasive cardiovascular monitors, the recognition and treatment of shock syndromes including trauma and burns, airway management and the use of mechanical ventilation, the diagnosis and treatment of renal insufficiency, management and treatment of infectious problems including septic shock, management of fluids and electrolytes, and nutrition.

Student time distribution: Inpatient 80%, Conferences/Lectures 20%; Subspecialty Care 100%

Major teaching responsibility: Attendings

Patients seen/weekly: 50

On call/weekend responsibility: Variable

## **Research**

### **(M95 900)**

L. Michael Brunt, M.D., Room 3503 Kingshighway Building, Barnes-Jewish Hospital, North Campus, 454-7194. Minimally invasive surgery, including endocrine applications. Minimum rotation length: four weeks. Under the auspices of the Washington University Institute for Minimally Invasive Surgery (WUIMIS), a number of surgeons are investigating the physiologic consequences of laparoscopic surgery and new applications for procedures and technologies. Dr. Brunt is currently investigating clinical outcomes of various laparoscopic surgical procedures evaluating new biomechanical tissue prostheses for use in laparoscopic hiatal hernia surgery.

David W. Dietz, M.D., 14th Floor Queeny Tower, Barnes-Jewish Hospital, 454-7179. Clinical research in colorectal cancer and inflammatory bowel disease. Minimum rotation length: one month. Ongoing projects are focused on predictors of response to neoadjuvant therapy in rectal cancer. Currently, 60 Cu-ATSM PET scanning is being evaluated as a measure of tumor hypoxia and response to neoadjuvant chemoradiation. Potential also exists for the evaluation of molecular and genetic markers in this context through collaboration with the laboratory of Howard McLeod, PharmD. A number of clinical projects are also available utilizing the colorectal cancer and Crohn's disease databases maintained in the section. The student will work under the direct supervision of Dr. David Dietz and other members of the Section of Colon and Rectal Surgery.

Susan E. Mackinnon, M.D., 17424 East Pavilion 362-4587. Peripheral nerve surgical research. Our laboratory investigates nerve injury and regeneration including nerve transplantation. The student will be encouraged to design and complete his/her own research study during the elective.

Susan E. Mackinnon, M.D., 17424 East Pavilion, 362-4593. Plastic surgery research laboratories. Minimum rotation length: six weeks. The research rotation can be conducted in the plastic surgery laboratories under the direction of Drs. Kane, Lowe, Tung, Hussussian, or Mackinnon. A project will be designed with the student prior to his/her rotation on plastic surgery so that all the materials and methods will be available at the beginning of the rotation. Ongoing projects include: (1) nerve repair and regeneration; (2) the effects of growth factors on wound healing; (3) in vivo tissue generation and tissue differentiation; (4) the mechanical, structural and biochemical effects of stress on scar tissue maturation; (5) in vivo anatomy of craniofacial deformities; and (6) outcome analysis of methods of cleft lip and palate management.

## **Faculty**

**TIMOTHY J EBERLEIN, MD** Bixby Professor of Surgery (General Surgery), Head of the Department of Surgery

**REBECCA L AFT, MD, PHD** Assistant Professor of Surgery (General Surgery)

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**MARC R MOON, MD** Associate Professor of Surgery (Cardiothoracic Surgery)

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**NABIL A MUNFAKH, MD** Associate Professor of Surgery (Cardiothoracic Surgery)

**MATTHEW G MUTCH, MD** Assistant Professor of Surgery (General Surgery)

**GEORGE BORIS MYCHALISKA, MD** Assistant Professor of Surgery (Pediatric Surgery)

**TERENCE M. MYCKATYN** Instructor in Surgery (Plastic and Reconstructive Surgery)

**CATHY KIM NAUGHTON, MD** Assistant Professor of Surgery (Urologic Surgery)

**NEAL NEUMAN, MD** Instructor in Clinical Surgery (Urologic Surgery)

**CHARLES H NICOLAI, MD** Instructor in Surgery (Urologic Surgery)

**THOMAS E NIESEN, MD** Instructor in Clinical Surgery (General Surgery)

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## **Department's Website**

<http://www.surgery.wustl.edu/>

## **Alvin J. Siteman Cancer Center**

### **Introduction**

The Alvin J. Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine is world renowned for its basic science, translational, and prevention and control research. The Siteman Cancer Center (SCC) enhances and promotes interactions among the cancer research efforts throughout the campus and has provided an organizational focus and stimulus for researchers to continue to produce high quality institutional research. The Center holds more than \$120 million in extramural funding for cancer research and is organized into eight research programs (Cancer Genetics, Cancer and Developmental Biology, Tumor Immunology, Hematopoietic Development and Malignancy, Cellular Proliferation, Oncologic Imaging, Prevention and Control, and Translational and Clinical Research). The SCC also provides 14 shared resource facilities to its more than 240 research members. Shared resource facilities include: Bioinformatics Core, Biostatistics Core, Clinical Trials Core, Embryonic Stem Cell Core, Hereditary Cancer Core, High Speed Cell Sorter Core, Molecular Core Laboratory, Multiplexed Gene Analysis Core, Pharmacology Core, Proteomics Core, Small Animal Cancer Imaging Core, Health Behavior and Outreach Core, Good Manufacturing Practice Facility, and Tissue Procurement Core.

The SCC provides numerous opportunities in cancer research education and training through seminars, conferences, courses and research opportunities. Individuals are encouraged to contact the Siteman Cancer Center at (800) 600-3606 or via the web site [www.siteman.wustl.edu](http://www.siteman.wustl.edu) for more information. A few educational opportunities are listed below.

### **SCC Basic Science Seminar Series**

The SCC sponsors a campus-wide seminar series for basic cancer biology topics on the first Thursday of each month at 3 p.m. at the Eric P. Newman Education Center. Speaker information can be found on the SCC web site at [www.siteman.wustl.edu](http://www.siteman.wustl.edu). Attendance is open.

### **Research Program Specific Activities**

All of the Siteman Cancer Center research programs have regular internal seminars or work-in-progress discussion groups, and these frequently involve students and postdocs.

- The Cancer Genetics Program has a seminar on the second Tuesday of each month; a new discussion group around new gene discovery is planned. Contact Paul J. Goodfellow, Ph.D., for more information.
- The Cancer and Developmental Biology Program runs a biweekly laboratory research presentation seminar, which meets at 9 a.m. on Tuesdays. Contact David M. Ornitz, Ph.D., M.D., for more information.
- The Tumor Immunology Program utilizes the long- standing Immunology Seminar Series sponsored by the Department of Pathology and Immunology at 4 p.m. on Mondays in the Eric P. Newman Education Center. There are also dedicated sessions allotted to the topics of Tumor Immunology. Contact Robert D. Schreiber, Ph.D., for more information.
- The Hematopoietic Development and Malignancy Program convenes a weekly journal club to review primary and published data. About three-fourths of the presentations are in a journal club format, with the remainder from participating laboratories. Current literature regarding hematopoiesis and current trials in gene therapy are presented and critically reviewed. Contact Timothy J. Ley, M.D., for more information.
- The Cellular Proliferation Program sponsors a weekly seminar series entitled "Signaling/Cell Cycle." Each academic year, up to six speakers from outside the medical school are invited to present their current work. On weeks alternating with invited speakers, graduate students and postdoctoral research fellows working in the laboratories of our members present their research. Contact Helen M. Piwnicka-Worms, Ph.D., for more information.
- The Marilyn Fixman Clinical Cancer Conference is held on the third Wednesday of each month in the Steinberg Amphitheater on the Barnes-Jewish Hospital north campus. Speakers at this conference present a disease-based clinical topic at each session. Contact the SCC administration office at (314) 454-8439 for the schedule.
- The Prevention and Control Program has multiple regular research group meetings in nicotine dependence and smoking cessation, early detection, cancer communication and intervention research and psychosocial factors. Contact Edwin B. Fisher, Ph.D., for more information.
- There are more than 15 weekly/biweekly disease-based clinical conferences, and these can be found on the SCC web site.

## Cancer Biology Special Emphasis Pathway

The SCC launched a new special emphasis pathway as part of the Division of Biology and Biomedical Sciences graduate program in 2002. The SCC will sponsor up to 16 total (new and continuing) students per year to participate in the program, which will be focused on multi-disciplinary cancer biology research. The pathway will include participation in a cancer biology course, the SCC basic science seminar series, work-in-progress inter-lab meetings and journal clubs with at least one of the five basic research programs within the SCC. For more information on this new program contact Lee Ratner, M.D., Ph.D.

## Link to Website

<http://www.siteman.wustl.edu/>

## Faculty

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**Mauricio Lisker-Melman** Associate Professor of Medicine, Division of Gastroenterology, Washington University School of Medicine, Director Hepatology Program, Washington University School of Medicine

**Jacob E Locke** Assistant Professor of Radiation Oncology, Washington University Medical School

**Fanxin Long** Assistant Professor of Medicine, Division of Bone and Mineral Diseases, Washington University School of Medicine

**Greg D Longmore** Associate Professor of Medicine, Division of Hematology, Washington University School of Medicine

**Daniel A Low** Assistant Professor of Radiology, Radiation Oncology Center, Mallinckrodt Institute of Radiology, Washington University School of Medicine

**James B Lowe III** Assistant Professor of Surgery, Division of Plastic and Reconstructive Surgery, Washington University School of Medicine

**Douglas M Lublin** Associate Professor of Pathology and Immunology, Division of Laboratory Medicine, Washington University School of Medicine

**Lori Luchtman-Jones** Assistant Professor of Pediatrics, Division of Hematology and Oncology, Washington University School of Medicine

**Gregg T Lueder** Associate Professor of Ophthalmology and Visual Sciences, Washington University School of Medicine

**Douglas A Luke** Associate Professor of Community Health-Biostatistics, Saint Louis University School of Public Health

**Robert H Mach** Professor of Radiology, Division of Radiological Sciences, Washington University School of Medicine

**Pamela AF Madden** Research Assistant Professor of Psychiatry, Washington University School of Medicine

**Philip W Majerus** Professor of Medicine; Co-Director of the Division of Hematology, Washington University School of Medicine

**Horacio M Maluf** Assistant Professor of Pathology and Immunology, Division of Anatomic Pathology, Washington University School of Medicine

**David B Mansur** Assistant Professor of Radiation Oncology, Washington University School of Medicine

**Garland R Marshall** Professor of Chemistry and Molecular Biophysics, Washington University School of Medicine

**Philip J Mason**

**Martin L Mayse**

**Douglas J McDonald** Professor of Orthopaedic Surgery, Washington University School of Medicine

**Robert C McKinstry III** Assistant Professor of Radiology, Division of Neuroradiology, Washington University School of Medicine

**Robert P Mecham** Alumni Endowed Professor of Cell Biology & Medicine, Washington University School of Medicine

**Bryan F Meyers** Assistant Professor of Surgery, Division of Cardiothoracic Surgery, Washington University School of Medicine

**Tom R Miller** Professor of Radiology and Biomedical Engineering, Washington University School of Medicine

**Jeffrey H Miner** Assistant Professor of Medicine, Renal Division, Washington University School of Medicine

**Robert K Minkes** Assistant Professor of Surgery and Pediatrics, Department of Surgery, Division of Pediatric Surgery, Washington University School of Medicine

**Mark A Mintun** Professor of Radiology, Mallinckrodt Institute of Radiology, Washington University School of Medicine

**Thalachallour Mohanakumar** Professor of Surgery and Pathology, Director of Histocompatibility and Immunogenetics, Washington University School of Medicine; and Director, Human Islet Core Facility, Diabetes Research Training Center, Washington University School of Medicine; and Jacqueline G. and William E. Maritz Chair in Immunology and Oncology, Washington University School of Medicine

**Barbara S Monsees** Professor of Radiology, Division of Diagnostic Radiology, Section of Breast Imaging, Washington University School of Medicine, Chief of Breast Imaging Section, Department of Radiology, Washington University School of Medicine

**Christopher J Moran** Associate Professor of Radiology, Neuroradiology Section, Washington University School of Medicine

**Eduardo G Moros** Associate Professor of Radiation Oncology, Division of Radiation Physics, Washington University School of Medicine

**Aubrey R Morrison** Professor of Medicine, Division of Renal Diseases, Washington University School of Medicine

**Louis J Muglia** Associate Professor of Pediatrics, Division of Endocrinology and Metabolism, Washington University School of Medicine

**Kenneth M Murphy** Professor of Pathology and Immunology, Washington University School of Medicine

**Anthony J Muslin** Professor of Medicine, Division of Cardiovascular, Washington University School of Medicine

**David G Mutch** Ira C. and Judith Gall Professor of Obstetrics and Gynecology and Director of the Division of Gynecologic Oncology, Washington University School of Medicine

**George B Mychaliska** Assistant Professor of Surgery and Pediatrics, Department of Surgery, Division of Pediatric Surgery, Washington University School of Medicine

**Robert J Myerson** Professor of Radiation Oncology, Mallinckrodt Institute of Radiology, Washington University School of Medicine

**Michael J Naughton** Assistant Professor of Medicine, Division of Oncology, Washington University School of Medicine

**Deborah V Novack** Instructor in Pathology and Immunology, Division of Anatomic Pathology, Washington University School of Medicine

**Brian Nussenbaum** Assistant Professor of Otolaryngology, Division of Head and Neck Surgical Oncology, Washington University School of Medicine

**Margaret A Olsen**

**Nobuyuki Oyama** Instructor in Radiology, Division of Radiological Sciences, Washington University School of Medicine

**Tej K Pandita** Assistant Professor of Radiation Oncology, Division of Radiation and Cancer Biology, Washington University School of Medicine

**Randal C Paniello** Associate Professor of Otolaryngology, Division of Head and Neck Surgical Oncology, Washington University School of Medicine

**Tae S Park** Shi H. Huang Professor of Neurological Surgery, Washington University School of Medicine, Neurosurgeon-in-Chief, St. Louis Children's Hospital, Washington University School of Medicine

**Alec Patterson** Joseph C. Bancroft Professor and Head, Section of Thoracic Surgery, Washington University School of Medicine

**Stanford L Peng** Assistant Professor of Medicine, Division of Rheumatology, Washington University School of Medicine

**Carlos A Perez** Director of Radiation Oncology Center and Professor of Radiology, Mallinckrodt Institute of Radiology, Washington University School of Medicine

**Arie Perry** Assistant Professor of Pathology, Division of Neuropathology, Washington University School of Medicine

**John D Pfeifer** Associate Professor of Pathology and Immunology, Division of Anatomic Pathology, Washington University School of Medicine

**Christine TN Pham** Assistant Professor of Medicine, Division of Rheumatology, Washington University School of Medicine

**Jay F Piccirillo** Associate Professor of Otolaryngology and Director of Clinical Outcomes Research Office, Washington

University School of Medicine

**David R Piwnica-Worms** Professor, Departments of Radiology, Molecular Biology and Pharmacology, Washington University Medical School

**Katherine P Ponder** Associate Professor of Medicine and Biochemistry & Molecular Biophysics, Washington University School of Medicine

**Matthew A Powell** Instructor of Obstetrics and Gynecology, Division of Gynecologic Oncology, Washington University School of Medicine

**James A Purdy** Professor of Radiation Oncology, Associate Director of the Radiation Oncology Center and Chief, Physics Section, Washington University School of Medicine

**Janet S Rader** Associate Professor of Obstetrics and Gynecology, Division of Gynecologic Oncology, Washington University School of Medicine

**Yi Rao** Associate Professor of Anatomy and Neurobiology, Washington University School of Medicine

**Antonella L Rastelli** Instructor in Medicine, Division of Bone and Mineral Diseases, Section of Endocrine and Oncologic Surgery, Washington University School of Medicine

**Lee X Ratner** Professor of Medicine, Division of Oncology, Washington University School of Medicine

**Theodore Reich** Professor of Psychiatry and Professor of Genetics, Washington University School of Medicine

**David E Reichert** Research Instructor in Radiology, Division of Radiological Sciences, Washington University School of Medicine

**William R Reinus** Director of Musculoskeletal Radiology, Associate Professor of Radiology, Mallinckrodt Institute of Radiology, Washington University School of Medicine

**John P Rice** Professor, Department of Psychiatry, Section of Mathematics, Washington University School of Medicine; and Professor of Psychiatry, Section of Mathematics, Washington University School of Medicine

**Keith M Rich** Associate Professor of Neurosurgery, Washington University School of Medicine

**Eric J Richards** Associate Professor of Biology, Washington University School of Medicine

**Stephen L Ristvedt** Assistant Professor in Psychiatry, Washington University School of Medicine

**Buck E Rogers** Assistant Professor of Radiation Oncology, Division of Radiation and Cancer Biology, Washington University School of Medicine

**John W Rohrbach** Associate Professor of Psychiatry, Washington University School of Medicine

**Daniel B Rosenbluth** Associate Professor of Medicine, Division of Pulmonary and Critical Care Medicine, Washington University School of Medicine

**Joseph L Roti Roti** Professor, Chief, Section of Cancer Biology, Associate Director for Biological Research, Radiation Oncology Center, Department of Radiology, Washington University School of Medicine

**Henry D Royal** Professor in Radiology, Washington University School of Medicine

**Deborah C Rubin** Associate Professor of Medicine, Division of Gastroenterology, Washington University School of Medicine

**David A Rudnick** Instructor of Pediatrics, Developmental Biology Unit, Washington University School of Medicine

**Jennifer Prah Ruger** Research Assistant Professor, Department of Medicine, Division of General Medical Sciences, Washington University School of Medicine

**John H Russell** Professor of Molecular Biology and Pharmacology, Washington University School of Medicine

**Stuart S Sagel** Professor of Radiology, Division of Diagnostic Radiology, Washington University School of Medicine

**Linda J Sandell** Professor and Director of Research, Department of Orthopaedic Surgery, Washington University School of Medicine

**Mark S Sands** Associate Professor of Medicine, Division of Oncology, Washington University School of Medicine

**Scott Saunders** Assistant Professor of Pediatrics and Molecular Biology & Pharmacology, Washington University School of Medicine

**Kenneth B Schechtman** Associate Professor of Biostatistics, Washington University School of Medicine

**Tim B Schedl** Associate Professor of Genetics, Washington University School of Medicine

**Maria E Schmidt** Assistant Professor of Radiology, Division of Diagnostic Radiology, Section of Breast Imaging, Washington University School of Medicine

**Steven B Scholnick** Associate Professor of Otolaryngology, Division of Head and Neck Surgical Oncology, Washington University School of Medicine

**Mario Schootman** Assistant Professor of Medicine, Division of Health Behavior Research, Washington University School of Medicine

**Michelle Z Schultz** Assistant Professor of Medicine, Division of Hematology, Washington University School of Medicine

**Alan L Schwartz** Harriet B. Spoeher Professor and Chairman of Pediatric, Washington University School of Medicine

**Roberta D Sengelmann** Assistant Professor of Medicine, Division of Dermatology, Washington University School of Medicine, Director, Cutaneous (Mohs') Surgery, Barnes Jewish Hospital

**Robert M Senior** Dorothy R. and Hubert C. Moog Professor in Pulmonary Medicine, Division of Pulmonary and Critical Care Medicine, Washington University School of Medicine

#### **Donald G Sessions**

**William D Shannon** Assistant Professor of Biostatistics, Department of Medicine, Division of General Medical Sciences, Washington University School of Medicine, Assistant Professor, Division of Biostatistics, Washington University School of Medicine

**Andrey S Shaw** Professor of Pathology and Immunology, Center for Immunology, Washington University School of Medicine

**Shalini Shenoy** Assistant Professor of Pediatrics, Division Hematology/Oncology, Washington University School of Medicine

**Cary L Siegel** Assistant Professor of Radiology, Director, Genitourinary Radiology, Mallinckrodt Institute of Radiology, Washington University School of Medicine

**Marilyn J Siegel** Professor of Pediatrics and Professor of Radiology, Division of Diagnostic Radiology, Washington University School of Medicine

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**Erik J Sirevaag** Instructor of Psychology in Psychiatry, Washington University School of Medicine

**James B Skeath** Assistant Professor of Genetics, Washington University School of Medicine

**Barry P Sleckman** Assistant Professor of Pathology and Immunology, Washington University School of Medicine

#### **Sheng-Kwei "Victor" Song**

**J. Gershon Spector** Professor of Otolaryngology, Division of Head and Neck Surgical Oncology, Washington University School of Medicine

**Philip D Stahl** Edward C. Mallinckrodt Jr. Professor and Head of Cell Biology & Physiology, Washington University Medical School

**William F Stenson** Professor of Medicine, Division of Gastroenterology, Washington University School of Medicine

#### **Sheila A Stewart**

**Steven M Strasberg** Pruett Professor of Surgery, Division of General Surgery, Section of Hepatobiliary, Pancreatic and Gastrointestinal Surgery, Washington University School of Medicine, Head, Section of Hepatobiliary, Pancreatic and Gastrointestinal Surgery, Washington University School of Medicine

**Brian K Suarez** Professor of Psychiatry, Washington University School of Medicine

**Walton Sumner II** Associate Professor of Medicine, Division of General Medical Sciences, Washington University School of Medicine

#### **John B Sunwoo**

**Robert A Swarm** Associate Professor of Anesthesiology and Chief of the Division of Pain Management, Washington University School of Medicine, Director, Pain Management Center, Barnes-Jewish Hospital, Washington University School of Medicine

**Wojciech A Swat** Assistant Professor of Pathology and Immunology, Washington University School of Medicine

**Susan C Sylvia** Instructor of Psychology, St. Louis Children's Hospital

**Paul H Taghert** Professor of Anatomy and Neurobiology, Washington University School of Medicine

**Benjamin R Tan** Assistant Professor of Medicine, Division of Oncology, Washington University School of Medicine

**John-Stephen A Taylor** Professor of Chemistry, Washington University School of Medicine

**Marie E Taylor** Instructor in Radiation Oncology, Washington University School of Medicine

**Sharlene A Teefey** Associate Professor of Radiology, Washington University School of Medicine, Attending Staff, Department of Radiology Barnes-Jewish Hospital, Consulting Staff, Department of Radiology, St. Louis Children's Hospital

**Steven L Teitelbaum** Wilma and Roswell Messing Professor of Pathology, Division of Anatomic Pathology, Washington University School of Medicine

**Wade L Thorstad** Instructor in Radiation Oncology, Mallinckrodt Institute of Radiology, Washington University School of Medicine

**Tiffany L Tibbs** Instructor in Psychiatry, Washington University School of Medicine

**Alexandre A Todorov** Research Assistant Professor of Psychiatry, Washington University School of Medicine

**Michael H Tomasson** Assistant Professor of Medicine, Division of Oncology, Washington University School of Medicine

**Sergey M Troyanovsky** Associate Professor of Medicine, Division of Dermatology, Washington University School of Medicine

**William R True** Professor of Community Health, School of Public Health, Saint Louis University School of Public Health

**Thomas H Tung** Assistant Professor of Surgery, Division of Plastic and Reconstructive Surgery, Washington University School of Medicine

**Peter G Tuteur** Associate Professor of Medicine, Division of Pulmonary & Critical Care Medicine, Washington University School of Medicine

**Emil R Unanue** Mallinckrodt Professor and Chairman of Pathology and Immunology, Washington University School of Medicine, Pathologist-in-Chief, Barnes-Jewish Hospital and Allied Hospitals

**Ravindra Uppaluri** Assistant Professor in Otolaryngology, Washington University School of Medicine

**Suresh Vedantham**

**Teresa J Vietti** Professor Emeritus of Pediatrics, Division of Hematology and Oncology, Washington University School of Medicine

**Ravi Vij** Instructor of Medicine, Division of Oncology, Washington University School of Medicine

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**Mark S Walker** Instructor of Medicine, Division of Health Behavior Research, Washington University School of Medicine

**Hanlin L Wang**

**Yian Wang** Associate Professor of Surgery, Division of General Surgery, Washington University School of Medicine

**Jason D Weber** Assistant Professor of Medicine, Division of Oncology, Washington University School of Medicine

**Katherine N Weilbaecher** Assistant Professor of Medicine, Division of Oncology, Washington University School of Medicine

**Steven J Weintraub** Assistant Professor of Surgery, Division of Urologic Surgery, Washington University School of Medicine

**Bruce R Whiting**

**Samuel A Wickline** Professor of Medicine, Co-Director of Cardiovascular Division, Washington University School of Medicine

**Kimberly N Wiele** Assistant Professor of Radiology, Division of Diagnostic Radiology, Section of Breast Imaging, Washington University School of Medicine

**David B Wilson** Associate Professor of Pediatrics and Chief of the Division of Pediatric Hematology/Oncology, Washington University School of Medicine

**Richard K Wilson** Associate Professor of Genetics, Washington University School of Medicine

**Franz J Wippold** Associate Professor of Radiology, Mallinckrodt Institute of Radiology, Washington University School of Medicine

**Karen L Wooley** Professor of Chemistry, Washington University School of Medicine

**Ricardo J Wray** Assistant Professor of Community Health, School of Public Health, Saint Louis University, St. Louis, MO

**Mai Xu** Instructor of Radiology, Division of Radiation Oncology, Washington University School of Medicine

**Lourdes R Ylagan** Instructor in Pathology and Immunology, Division of Surgical Pathology, Washington University School of Medicine

**Wayne M Yokoyama** Professor of Medicine and Chief of the Division of Rheumatology, Washington University School of Medicine

**Ming You** Professor of Surgery, Division of General Surgery, Washington University School of Medicine

**Steven X Zheng** Assistant Professor of Pathology and Immunology, Division Experimental Pathology Research, Washington University School of Medicine

**Imran X Zoberi** Instructor in Radiation Oncology, Division of Radiology-Radiation Oncology, Washington University School of Medicine

## **Teaching and Research Divisions and Programs**

### **Teaching and Research Divisions and Programs**

#### **Division of Biostatistics**

The Division of Biostatistics is a medical school-wide facility that engages in teaching, research and biostatistical consultation activities. Interested students may pursue intensive studies through electives offered by the division. At the initiative of other departments, the division also offers additional short courses in biostatistics. The division participates actively in both pre-doctoral and post-doctoral training. In addition to the core research program of the division, its research activities include collaborative projects with various departments of the medical school. Biostatistical consultation represents an important activity of the division, providing expertise in both theoretical and applied areas.

Research activities of the division span a wide range of topics dealing with a number of disorders of considerable public health importance, and provide research opportunities at both theoretical and applied levels. Several research projects involve close interaction and collaboration with a number of research groups at the Medical Center. The present core research program of the division deals with genetic epidemiology, especially as it relates to cardiovascular disease. A number of theoretical and applied problems are addressed, including: nature-nurture resolution and identification of the genetic basis of risk factor domains such as lipids, obesity, blood pressure and hypertension, and insulin resistance and diabetes; exploration of temporal trends in the degree of genetic and environmental effects; and multivariate associations among multiple risk factors. Timely theoretical issues also are addressed, such as the sampling of families through patients and statistical properties of methods of data analysis. Most recent research also emphasizes gene-gene and gene-environment interactions.

Present collaborative research projects include: a coordinating center for a multicenter family and genetic study of heart disease (FHS); a coordinating center for a multicenter study to assess the genetic basis of coronary artery calcification (SCAN); a coordinating center for a multicenter study to assess the genetic basis of response to exercise training (HERITAGE); a coordinating center for a multicenter NETWORK study on the genetics of hypertension (HyperGEN) and the Family Blood Pressure Program (FBPP); coordinating centers for two multicenter studies to assess the genetic basis of response to intervention through incorporation of gene-environment interactions (GOLDN and GenSalt); a coordinating center for the Consortium for Radiologic Imaging Studies for Polycystic Kidney Disease (CRISP) to determine the effectiveness of new and innovative imaging methods for monitoring and assessing the progress of PKD; a coordinating center for the Polycystic Kidney Disease Treatment Network (PKD-TN) to evaluate hypertensive medications that may be effective in slowing progression of PKD in individuals suffering from the disease; a coordinating center for a trial in ocular hypertensives (OHTS); important collaborative studies of Alzheimer's disease and cancer through support roles as the ADRC biostatistics core and the Alvin J. Siteman Cancer Center biostatistics core; studies on ischemic heart disease; several epidemiological research projects developing methods for increasing public awareness and utilization of measures that are known to decrease the likelihood of developing heart disease and for encouraging behaviors that will improve prognosis following a heart attack.

The division provides consultation in a wide range of areas including the statistical design of experiments and clinical trials, protocol development, database management, analysis of data and interpretation of results. Some of the areas of special strength and expertise include cardiovascular biostatistics, computing and statistical packages. The division is well-equipped to provide assistance at the stage of preparing grant applications, including careful discussions of study design, sample size calculations, randomization schemes, computer resources and data analysis.

#### **GENETIC EPIDEMIOLOGY MASTERS OF SCIENCE (GEMS) PROGRAM (M21)**

The Genetic Epidemiology Masters of Science (GEMS) training program provides an interdisciplinary educational opportunity for people who want to work at the dynamic nexus of genetics and medicine. There are growing needs for scientists with this training both in academia and industry. With the wealth of data from the Human Genome Project and the availability of powerful new computational approaches, abundant opportunities are now available to explore and characterize the interplay between genes and the environment that affect the biological processes that underlie disease.

#### **MASTER OF SCIENCE (M.S.) DEGREE**

The core faculty for this multidisciplinary program come from 11 departments/divisions in the School

of Medicine. The GEMS degree program is sponsored by the Division of Biostatistics and the departments of Genetics and Psychiatry, and includes world-renowned scientific leaders in their respective areas. D.C. Rao, Ph.D., director of the Division of Biostatistics and the GEMS program director, is one of the founding fathers of the field. The full-time, two-year, 44 credit hour GEMS program is designed to prepare students to work at the interface of genetics, statistics, epidemiology and computing.

### **CERTIFICATE IN GENETIC EPIDEMIOLOGY**

We offer a Certificate in Genetic Epidemiology exclusively to Washington University faculty and staff. The Certificate may be earned after successful completion (with a minimum of a "B" average) of five core courses (14 credit hours) that are normally offered to Master's candidates in Genetic Epidemiology. These courses are: M21 505 Biostatistics for Research Workers, M21 515 Fundamentals of Genetic Epidemiology, M21 500 Introduction to General Epidemiology (all offered in the fall semester), and M21 5482 Human Linkage and Association Analysis and M21 550 Introduction to Bioinformatics (both offered in the spring semester). Courses may be taken over a period of several years.

### **Prospective Students**

Since Genetic Epidemiology is an interdisciplinary field, we expect applicants to come from a variety of backgrounds, but primarily from the biological or the quantitative sciences, and possibly at different points in their careers: undergraduates with quantitative sciences (e.g., mathematics through calculus plus one semester of statistics) and/or biological sciences (at least through Fundamentals of Biology III: Genetics or equivalent) background; people with terminal degrees in other (related) disciplines who seek to gain expertise in genetic epidemiology; current employees of pharmaceutical and biotechnology companies seeking additional training and formal credentials in the field. All prospective students must provide evidence of basic skills in computer programming through coursework, documented experience or by passing a proficiency exam. Promising candidates who do not meet all the prerequisites will work with the Program Director to take the appropriate courses or training to rectify weaknesses.

### **Location**

The GEMS Program is located in the Division of Biostatistics, on the third floor of Shriner's (706 S. Euclid), Rooms 3307-3311.

### **Further Information**

See our website at [www.biostat.wustl.edu/gems](http://www.biostat.wustl.edu/gems) or contact the Program Administrator (362-1052 or [pa@wubios.wustl.edu](mailto:pa@wubios.wustl.edu)) or write to:

The GEMS Program  
Division of Biostatistics  
Campus Box 8067  
660 S. Euclid Ave.  
St. Louis, MO 63110-1093  
Telephone: (314) 362-1052  
Fax: (314) 362-2693

### **Registration Instructions**

Students will register with the Program Administrator in Genetic Epidemiology. Before registering, current Washington University students must obtain appropriate consent from their division. Students outside the GEMS program enrolling in individual courses must have permission of the coursemaster.

### **Academic Calendar**

The GEMS program follows the calendar of the College of Arts and Sciences.

### **Link to Website**

<http://www.biostat.wustl.edu/>

### **Courses**

M21 500 Introduction to General Epidemiology

Instructor: Linda B. Cottler, Ph.D., 286-2252

Epidemiology is the study of health and disease in the population. This course, while introducing epidemiologic methods and classic medical studies, emphasizes the clinical importance of psychiatric epidemiology. Cross-listed as M08 500 (MPE). Credit: 3 units.

#### M21 505 Biostatistics for Research Workers

Instructors: Michael A. Province, Ph.D., 362-3616; Kenneth B. Schechtman, Ph.D., 362-2271

Designed for those researchers who want to expand their knowledge of practical methods in statistics. Oriented toward statistical and epidemiological concepts, applications, practical hints and hands-on approach to data, rather than theory or derivation of formulas. Heavy use is made of SAS/PC for in-class examples and homework problems. We will cover classical methods (e.g., t-test, chi-square, correlation), multivariate methods (regression, logistic models, ANOVA, survival analysis), study design, probability and maximum likelihood. Some selected topics (e.g., reliability, factor analysis, survey and sampling, research design) are then covered in greater detail. Students are encouraged to attend the 3 mini-courses offered by the Division of Biostatistics on "Computing/Unix," "SAS," and "Statistics" prior to this course. Contact the Program Administrator (pa@wubios.wustl.edu) for details. Permission of the Coursemaster required (362-1952). Cross-listed as M08-505 (MPE) and L41-5066 (Biology). Credit: 3 units.

#### M21 515 Fundamentals of Genetic Epidemiology

Instructors: Treva K. Rice, Ph.D., 362-3662; Brian K. Suarez, Ph.D., 362-9433

Causes of phenotypic variation, familial resemblance/aggregation, heritability (family, twin and adoption designs), biometrical genetics, Hardy-Weinberg Equilibrium, major gene, segregation analysis, ascertainment, study designs, basic concepts in linkage and association analysis. (Lab practice with SEGPATH, PAP, S.A.G.E.) Credit: 3 units.

#### M21 535 Population Genetics

Instructor: Alan R. Templeton, Ph.D., 935-6868

An introduction to the basic principles of population and ecological genetics. Mechanisms of microevolutionary processes; integrated ecological and genetic approach to study the adaptive nature of the evolutionary process. Prerequisite: L41 3051 Fundamentals of Biology III: Genetics. Cross-listed as L41 4181 (Biology). Credit: 3 units.

#### M21 540 Advanced Topics in Genetic Epidemiology

Instructors: Ingrid B. Borecki, Ph.D., 362-3690;

John P. Rice, Ph.D., 286-2572

Approaches and methods to take an investigation from the discovery of a genetic influence on a complex trait to gene localization and characterization; linkage and association studies with emphasis on quantitative traits; parametric vs. non-parametric linkage methods; measured genotype analysis; concepts in population genetics; fine mapping and gene localization; characterization of genetic effects; role of animal models; current concepts in the genetics of complex traits including coronary heart disease, cancer, psychiatric disorders. Lecture and computer labs. Prerequisite: M21 515 Fundamentals of Genetic Epidemiology. Credit: 3 units.

#### M21 5482 Human Linkage and Association Analysis

Instructors: Anne M. Bowcock, Ph.D., 747-3264; John P. Rice, Ph.D., 286-2572

Meiosis, inheritance, Hardy-Weinberg Equilibrium, Linkage: definition, crossing over, map functions, phase, LOD scores, genetic heterogeneity, penetrance, phenocopies, and liability classes, multi-point analysis, non-parametric analysis (sibpairs and pedigrees), quantitative trait analysis, determination of power for mendelian and complex trait analysis, linkage disequilibrium analyses, allelic association (case control designs and family bases studies). Cross-listed as M08 5482 (Genetics). Credit: 2 units.

#### M21 550 Introduction to Bioinformatics

Instructors: C. Charles Gu, Ph.D., 362-3642; Gary D. Stormo, Ph.D., 747-5534

Provide a broad exposure to the basic concepts, methodology and application of bioinformatics to solve biological problems. Specifically, the students will learn the basics of online genomic/protein databases and database mining tools, and acquire understanding of mathematical algorithms in genome sequence analysis (alignment analysis, gene finding/predicting), and of the impact of recent developments in the DNA chip technology. Prerequisite: M21 505 Biostatistics for Research Workers. Credit: 3 units.

#### M21 599 Directed Independent Study

Instructors: D.C. Rao, Ph.D., 362-3608; Michael Lovett, Ph.D., 747-3265



A faculty member will work with the student in specific areas related to the student's primary needs. Prerequisite: permission of the instructor. Credit: variable, maximum 6 units.

#### M21 601 Independent Study

Instructors: D.C. Rao, Ph.D., 362-3608; Michael Lovett, Ph.D., 747-3265

Student selects a faculty mentor in consultation with the coursemasters and pursues independent study in the mentor's lab. The general goal is to strengthen the overall learning portfolio for the student. If specific areas are not indicated for additional study, work could be initiated toward the Independent Research to be carried out in the spring. Credit: 2 units.

#### M21 610 Independent Research

Instructors: D.C. Rao, Ph.D., 362-3608; Michael Lovett, Ph.D., 747-3265

Student selects a faculty mentor in consultation with the instructors to undertake a supervised research project in the mentor's lab. The goal is to acquire independent research skills and to develop excellent writing and presentation abilities. A report based on the research must be written in the format of an actual scientific publication and presented to a select audience. Credit: 9 units.

#### M21 615 Study Design and Management

Instructors: J. Philip Miller, A.B., 362-3617; C. Charles Gu, Ph.D., 362-3642

Learn critical study design issues; optimal study designs; cost-benefit analysis; power analysis; study management issues (protocols, data entry, data flow, database management, QC); special considerations for multicenter studies; human studies; principles and issues in designing linkage and association studies; and ethical, legal and social issues concerning human studies. Prerequisites: M21 505 Biostatistics for Research Workers and M21 540 Advanced Topics in Genetic Epidemiology. Credit: 3 units.

#### M21 620 Applied Topics in Genetic Epidemiology

Instructors: Michael A. Province, Ph.D., 362-3616; Howard L. McLeod, Ph.D., 747-5183

Approaches and methods to take an investigation from the discovery of a genetic influence on a complex trait to gene localization and characterization; linkage and association studies with emphasis on quantitative traits; parametric vs. non-parametric linkage methods; measured genotype analysis; concepts in population genetics; fine mapping and gene localization; characterization of genetic effects; role of animal models; current concepts in the genetics of complex traits including coronary heart disease, cancer, psychiatric disorders. Lecture and computer labs. Prerequisite: M21-540 Advanced Topics in Genetic Epidemiology. Permission of the Coursemaster required. Credit: 3 units.

## Faculty

**PING AN** Research Assistant Professor of Biostatistics

**INGRID B BORECKI, PHD** Associate Professor of Biostatistics

**JONATHAN R CORBETT** Research Instructor in Biostatistics

**MICHAEL R DEBAUN, MD** Associate Professor of Biostatistics

**MARY F FEITOSA, PHD** Research Assistant Professor of Biostatistics

**FENG GAO** Research Assistant Professor of Biostatistics

**MAE ETSUKO GORDON, PHD** Professor of Biostatistics

**CHI GU, PHD** Assistant Professor of Biostatistics

**BARBARA B HIXON** Assistant Professor Emerita of Biostatistics

**ALDI T KRAJA, PHD, PHD** Research Instructor in Biostatistics

**J. PHILIP MILLER** Professor of Biostatistics

**CURTIS ALAN PARVIN, PHD** Research Associate Professor of Biostatistics

**MICHAEL A PROVINCE, PHD** Professor of Biostatistics

**DABEERU C RAO, PHD** Professor of Biostatistics, Director of the Division of Biostatistics

**JOHN P RICE, PHD** Professor of Biostatistics

**TREVA KAY RICE, PHD** Research Associate Professor of Biostatistics

**STANLEY A SAWYER, PHD** Professor of Biostatistics

**KENNETH B SCHECHTMAN, PHD, MS** Associate Professor of Biostatistics

**WILLIAM D SHANNON, PHD** Assistant Professor of Biostatistics

**EDWARD LAWRENCE SPITZNAGEL JR, PHD** Professor of Biostatistics

**PAUL A THOMPSON, PHD** Research Associate Professor of Biostatistics

**CHENGJIE XIONG** Research Assistant Professor of Biostatistics

**YAN YAN, MD, PHD** Research Assistant Professor of Biostatistics

**KAI YU** Research Assistant Professor of Biostatistics

## Program in Medical Humanities

The Humanities Program in Medicine is a University-wide program dedicated to providing students with a broadened exposure to areas other than the biological sciences during their medical education. These areas include clinical ethics, jurisprudence, history, economics, literature and health policy. The program is directed from the dean's office at the medical school and utilizes faculty located at the Hilltop Campus, medical school and law school, as well as extramural faculty.

The mission of the program is to generate an appreciation of the relationship of human experience, culture, institutions and values to medicine and thereby help to educate professionals who will apply that understanding to their activities as practicing physicians, biomedical researchers and/or medical administrators. This program is an enhancement of an already strong curriculum in order to prepare medical students to pursue their professional careers more effectively. It takes a major role in the Practice of Medicine course integrated over the first two years of medical school. In addition, several electives are offered during the fourth year.

## Link to Website

<http://pohim.wustl.edu/>

## Courses

### M80 541 TOPICS IN MEDICINE/MEDICAL HUMANITIES

Instructors: Rebecca Dresser, J.D.; Stephen S. Lefrak, M.D., 454-7116

This is a required course given in the spring semester of the first year of medical school. This interdepartmental course is highly coordinated with Medical Humanities. Students select topics of interest for in-depth study initiated by discussions in a small-group, seminar format. Development of topics includes input from a broad range of disciplines, including sociology, philosophy, ethics, history, communications and economics, as well as the biological and medical sciences. It is offered as a menu of mini-courses, each limited to approximately 20 students. Each section consists of six two-hour sessions with a faculty member(s) devoted to an individual subject. Each student must select one course from the menu.

## Other Courses

### M04 582-01 ALZHEIMER'S DISEASE IN THE CLINIC AND THE LAB

Instructors: John C. Morris, M.D.; Alison M. Goate, D.Phil.; David M. Holtzman, M.D.; James E. Galvin, M.D.; Randy Lee Buckner, Ph.D.; Daniel W. McKeel Jr., M.D.; Joseph L. Price, D.Phil.; Thomas M. Meuser, Ph.D.; and others (all: 286-2881)

Alzheimer's disease (AD) affects more than 4 million Americans and this number will increase substantially as our population ages. The cost of caring for AD patients has been estimated at over \$100 billion annually. The human toll on patients and family members can be heartbreaking. Patients and families turn to primary care and specialist physicians (e.g., neurologists, psychiatrists, geriatricians) for answers to their plight. The good news for physicians is that research on AD is

moving at a rapid pace. Exciting advances in diagnostic techniques have occurred and new treatments are in the FDA approval pipeline.

Students in this course will be treated to a dynamic overview of the most exciting areas of AD clinical and basic science research from one of the top Alzheimer Disease Research Centers in the world. Find out how amyloid plaques and other AD-related abnormalities form in the brain and new discoveries about their possible reversal! The course includes lecture and student presentation components, as well as opportunities to observe patients and families in an active dementia clinic, participate in neuropathology evaluations of demented individuals, and access to Alzheimer investigators in molecular genetics, cell biology and neuroanatomy.

M80 856 Health Administration 1

Instructor(s): Dennis Lambert, Ph.D., 362-3266

Location: Health Administration, 4547 Clayton Ave.

Elective Contact: Dennis Lambert, Ph.D., 362-3266, [lambert@wubios.wustl.edu](mailto:lambert@wubios.wustl.edu)

Other Information: Elective length can extend through several four-week periods. Students should contact Dr. Lambert prior to the start of the elective regarding when and where to report on first day of elective.

Enrollment limit per period: 10

Valid start weeks for 4-week blocks are: Weeks 13, 17, 21, 25, 29, 33, 37, and 41. Valid Start weeks for longer blocks are 13, 17, and 29.

During the last decade, the U.S. health care system has undergone dynamic change. Socioeconomic and policy changes has resulted in a continuing evolution of new forms of health care delivery. The goal of this elective is to expose the senior medical student to the organization of the health care delivery system in the U.S. and discuss changes which have impacted the financing, organization, and delivery of health care. Students will also be exposed to the various methods insurers use for payment, and will become familiar with current organizations and operations of selected inpatient and outpatient provider organizations. The course will be conducted by faculty using a seminar approach drawing upon background textbooks, monographs, timely topical articles and current research publications to focus the weekly discussions.

By prior arrangement with the coursemaster, the medical student may elect to audit Health Administration Program classes of their choice in finance, human resource management, health law, health policy, and management information systems. This will be arranged according to individual interests and schedules.

Student time distribution: Conferences/Lectures 100%

Major teaching responsibility: Faculty

Patients seen/weekly: N/A

On call/weekend responsibility: None

## **Graduate Programs**

### **Graduate Programs**

#### **Division of Biology and Biomedical Sciences**

The Division of Biology and Biomedical Sciences, organized in 1973, is a consortium of university departments that together provide interdisciplinary training for full-time Ph.D. students. This unique organization was formed because of the realization that research and training in modern biology transcend the limits of departmental structure. The faculty consists of members of seven preclinical departments in the School of Medicine — Anatomy and Neurobiology, Biochemistry and Molecular Biophysics, Cell Biology and Physiology, Genetics, Molecular Microbiology, Pathology and Immunology, and Molecular Biology and Pharmacology; 10 clinical departments — Anesthesiology, Medicine, Neurology and Neurological Surgery, Obstetrics and Gynecology, Ophthalmology and Visual Sciences, Otolaryngology, Pediatrics, Psychiatry, Radiology and Surgery; the Department of Biology; the Department of Chemistry and Psychology in the School of Arts and Sciences; and the Department of Computer Science and Biomedical Engineering in the School of Engineering. More than 300 faculty are affiliated with one or more of 11 broad training programs: Biochemistry, Chemical Biology, Computational Biology, Developmental Biology, Evolution Ecology and Population Biology, Immunology, Molecular Biophysics, Molecular Cell Biology, Molecular Genetics, Molecular Microbiology and Microbial Pathogenesis, Neurosciences, and Plant Biology. Faculty in these programs take responsibility for all divisional activities, including recruiting, admissions, advising and research training. In addition, many divisional courses and seminars are offered by the participating faculty.

Currently, more than 500 graduate students are enrolled in the Division, including 150 students pursuing both the Ph.D. and the M.D. through the Medical Scientist Training Program (see Degree Programs area of Admissions and Educational Programs section.) Requirements for the Ph.D. include a series of courses tailored to a student's background and interests, qualifying examinations, execution of laboratory research and defense of a dissertation generated through original scientific investigation. Although students enter the Division through an affiliation with one of the 11 programs, it is possible for a student to transfer to another program as interests evolve. During the first year, advisers are appointed to assist students in selecting courses and seminars, as well as to help them in choosing three laboratory rotations in which they will spend several months becoming acquainted with a particular area of scientific research. Most students choose a research adviser by the end of the first year.

Applications for admission to the Ph.D. programs of the Division are due December 15 for matriculation the following fall. Admission is based on demonstrated ability, future promise and the number of positions currently available. Applicants should have completed rigorous undergraduate training in biology, chemistry, physics, psychology, computer science, engineering or related fields at a high level of scholastic achievement. It is required that each applicant take the aptitude test of the Graduate Record Examination (GRE). The advanced GRE subject test is highly recommended. Additional information and application for admission to the Ph.D. programs may be obtained from our web site at [dbbs.wustl.edu](http://dbbs.wustl.edu) or by writing to the Director of Admissions, Washington University School of Medicine, Campus Box 8226, 660 S. Euclid Ave., St. Louis, Missouri 63110-1093 (e-mail: [admissions@dbbs.wustl.edu](mailto:admissions@dbbs.wustl.edu)). Students who wish to pursue both the Ph.D. and M.D. degrees must apply to the Medical Scientist Training Program (see Degree Programs area of Admissions and Educational Programs section.)

Students admitted to the graduate programs are guaranteed full stipend and tuition support contingent upon satisfactory performance. The stipend for the 2004-2005 academic year will be \$22,000 annually. Tuition remission is provided to all students, and life, disability and health care also is provided by the Medical Center Student Health Service. The Division provides support for its Ph.D. students from several sources, including federally funded training grants provided by the National Institutes of Health.

#### **Link to Website**

<http://dbbs.wustl.edu>

#### **Courses**

The following graduate courses are offered by the Division of Biology and Biomedical Sciences, and they are available both to Ph.D. and M.D. students who meet the prerequisites for the appropriate course. Those courses particularly relevant to a given department are cross-listed under the department in this Bulletin. Faculty members in charge of courses and their departmental affiliations are shown at the end of each course description.

**L41 (Bio) 501 Human Anatomy and Development**

For full description, see Department of Anatomy and Neurobiology's M05 501A Human Anatomy and Development.

**L41 (Bio) 5011 Ethics and Research Science**

Instructor: Staff, Division of Biology and Biomedical Sciences, 362-3365

Exploration of ethical issues research scientists confront on a daily basis. Topics will include, but are not limited to: student-mentor relationships, allegations of fraud, collaborators' rights and responsibilities, conflicts of interest and confidentiality. Case study and scenario presentations will provide focus for discussions. Prerequisite: open to graduate students engaged in research. Six 90-minute sessions. Credit: 1 unit.

**L41 (Bio) 502 GENERAL PHYSIOLOGY**

Instructor: Robert S. Wilkinson, Ph.D., 362-2300

This course applies the fundamental physiological mechanisms of cell biology to the functions of the major organ systems of the body, namely, the cardiovascular, renal, respiratory, gastrointestinal and endocrine systems. The course is intended primarily for first-year medical students. The Physiology and Microscopic Anatomy courses are closely coordinated within the same schedule. Course continues into the spring semester with a different schedule. Prerequisites: Bio 5061 or the equivalent and permission of course director. Credit: 6 units.

**L41 (Bio) 5051 Foundations in Immunology**

Instructor: Herbert W. Virgin IV, M.D., Ph.D., 362-9223

Designed for graduate students as an in-depth introduction to immunology. Topics: antibody structure and genetics, B cell recognition, T cell receptor, major histocompatibility complex, T cell recognition, regulation of the immune response, immune mediators, humoral and cellular effector mechanisms. Discussion group will meet once a week on Thursday from 3-5 p.m. Prerequisite: Introductory Biochemistry and/or Genetics helpful. Permission of instructor. This course is referenced in the Department of Pathology and Immunology. Credit: 4 units.

**L41 (Bio) 5062 Central Questions in Cell Biology**

Instructor: Guojun Bu, Ph.D., 286-2860

This course explores areas of cell biology under active investigation. Topics include receptor biology, protein trafficking, signal transduction pathways. Special emphasis will be on the neuronal aspects of cell biology, with examples of pathogenesis of neurological diseases. For each section, introductory lectures are accompanied by discussions of experimental techniques and evaluations of the strategies employed in recent original papers. Prerequisites: L41 (Bio) 5068, or permission of instructor. Two hours each week alternating between lectures and discussions. This is referenced in the Department of Cell Biology and Physiology. Credit: 2 units.

**L41 (Bio) 5065 Cell Biology of the Stress Response**

Instructor: Joseph L. Roti Roti, Ph.D., 362-9770

Both prokaryotic and eukaryotic cells have evolved strategies to cope with potentially lethal stresses. Current knowledge of these stress responses will be discussed, including the repair of damaged DNA, cell-cycle check-point pathways, scavenging free radicals, alteration of gene expression to resist further exposure to stress and the basis for genomic instability. Prerequisite: Protein Chemistry, Nucleic Acid Chemistry. Two hours lecture and one hour journal club per week, with students presenting assigned paper(s). Credit: 2 units.

**L41 (Bio) 5066 Biostatistics for Research Workers**

For full description, see Division of Biostatistics, M21 505.

L41 (Bio) 5067 Intro to Bioinformatics

Instructors: C. Charles Gu, Ph.D., 362-3642; Gary D. Stormo, Ph.D., 747-5534

Provide a broad exposure to the basic concepts, methodology and application of bioinformatics to solve biological problems. Specifically, the students will learn the basics of online genomic/protein databases and database mining tools, and will acquire understanding of mathematical algorithms in genome sequence analysis (alignment analysis, gene finding/predicting), and of the impact of recent developments in the DNA chip technology. Prerequisite: M21 505 Biostatistics for Research Workers. Same as M21 GEMS 550.

L41 (Bio) 5068 Fundamentals of Molecular Cell Biology

Instructor: John A. Cooper, M.D., Ph.D., 362-3964

The goal of the course is for incoming PhD graduate students in Cell and Molecular Biology programs to learn about research and experimental strategies used to dissect molecular mechanisms that underlie cell structure and function. The course includes an emphasis on techniques of protein biochemistry. Therefore, enrolling students need to have strong backgrounds in cell biology and biochemistry. The format is two lectures and one small group discussion section per week. Each discussion section focuses on original research articles, for which the students prepare written critiques and then discuss. Three exams are given, taken home over weekends. Enrollment is restricted to graduate students in the PhD programs of the Division of Biology and Biomedical Sciences. If space permits, graduate students in other programs, medical students, and undergraduate students may enroll with explicit permission from the instructor. Prereqs: Courses in cell biology and biochemistry, comparable to L41 Biol 334 and L41 Biol 4501. Same as M15 5068 and M04 5068. Credit 4 units. Same as E62 BME 5068.

L41 (Bio) 5073 Bioorganic Chemistry Journal Club

Instructor: George W. Gokel Ph.D., 362-9297; staff

Discussion of recent literature and research topics in Bioorganic Chemistry. Credit: 1 unit.

L41 (Bio) 5074 RADIOPHARMACEUTICAL CHEMISTRY and BIOLOGY

Instructor: Carolyn J. Anderson, Ph.D., 362-8427

This course will teach the fundamentals of radio-pharmaceutical chemistry and biology for the diagnostic imaging of disease and therapy of cancer. Students will attend one weekly lecture, of which the first several weeks will focus on the basics of radionuclide production, radiochemistry and biological applications of radiopharmaceuticals. The lectures later in the semester will focus on research topics in molecular nuclear medicine. One class hour per week. Credit contingent on attendance and regular participation. Students will also be given papers and asked to write a critique. Credit: 1 unit.

L41 (Bio) 5092 Molecular and Developmental Biology Journal Club

Instructors: Aaron DiAntonio, M.D., Ph.D., 362-9925; Kristen L. Kroll, Ph.D., 362-7045

This course will teach the fundamentals of organization and oral presentation of scientific information. Presentations will be of recent articles from the literature relating to modern molecular and developmental biology, as well as original research by the students. Students will be evaluated on clarity and effectiveness of presentations. Credit: 1 unit.

L41 (Bio) 5102 ISSUES OF DISABILITY IN SOCIETY

Instructor: David B. Gray, Ph.D., 286-1658

The emergence of disability as a public health concern in the United States has implications for all aspects of society. This course allows the student to explore global disability issues with an emphasis on the more personal aspects of living with a disability, including policy issues, community integration, housing, assistive technology, transportation, employment self-care, recreation, communication and health care. The course has a multidisciplinary focus and is designed for students pursuing professional careers where issues of disability must be considered and for students who want to become informed of the impact of disability on the individual and society. Same as M01 OT 426.

L41 (Bio) 5123 Experimental Hematopoiesis Journal Club

Instructor: Daniel C. Link, M.D., 362-8771

Journal club in which papers that describe significant advances in the field of experimental hematopoiesis are discussed. Students are expected to present one paper per semester and attend

the weekly (1 hour) session. No prerequisites. Credit: 1 unit.

**L41 (Bio) 5125 Student-Run Cell Biology Journal Club**

Instructor: Robert W. Mercer, Ph.D., 362-6924

Participants (students) present summaries of current research published in various journals in the field of cell biology. A large component of this journal club includes coaching in oral presentation. Students receive one credit for regular participation and for making one presentation. Credit: 1 unit.

**L41 (Bio) 5128 Cell Biology of Extracellular Matrix Journal Club**

Instructor: J. Michael Shipley, Ph.D., 454-7990

This journal club covers a broad range of topics related to extracellular matrix, including the fields of biochemistry, molecular biology, cell biology and developmental biology. Speakers give a brief background to introduce the topic and then focus on one or two papers from the current literature. Presentations are given by faculty, students and postdoctorates. Students receive one credit for regular participation and for making one presentation. Credit: 1 unit.

**L41 (Bio) 5129 Glycobiology Discussion Group**

Instructor: Jacques U. Baenziger, M.D., Ph.D., 362-8730

Recent papers that deal with glycobiology will be presented each week for discussion. Those wishing to take the course for credit (1 per semester) must attend and present once during a semester. Anyone wishing to be placed on the e-mail list announcing topics should contact Jacques U. Baenziger, M.D., Ph.D., at [baenziger@pathology.wustl.edu](mailto:baenziger@pathology.wustl.edu). Credit: 1 unit.

**L41 (Bio) 5132 Cytoskeleton Discussion Group**

Instructor: John A. Cooper, M.D., Ph.D., 362-3964

Weekly presentations of recent literature and research, with each participant presenting once per semester. Opportunity for students to discuss the context, implications and future directions for research. Prerequisite: L41 (Bio) 5068 or undergraduate course in cell biology. This is referenced in the Department of Cell Biology and Physiology. Credit: 1 unit.

**L41 (Bio) 5137 Ion Channels Journal Club**

Instructor: Colin G. Nichols, Ph.D., 362-6630

Student will attend journal club every week and participate in group discussion of recent paper. Once per semester student will choose a paper and present it to the group. Credit: 1 unit.

**L41 (Bio) 5138 JOURNAL CLUB FOR THE MOLECULAR MECHANISM OF AGING**

Instructor: Shin-ichiro Imai, M.D., Ph.D., 362-7228

Why do we age? What causes aging? How is our life span determined? This new journal club will address such fundamental but challenging questions of aging and longevity. Recent studies on aging and longevity are now unveiling regulatory mechanisms of the complex biological phenomenon. We'll cover the latest progress in this exciting field and stimulate discussions on a variety of topics including aging-related diseases. One hour of paper presentation and discussion per every two weeks. Prerequisite: Basic knowledge of molecular biology and genetics of model organisms, such as yeast, *C. elegans*, *Drosophila* and mouse. Credit: 1 unit.

**L41 (Bio) 5142 Cell and Molecular Biology of Bone**

Instructor: Keith A. Hruska, M.D., 286-2855

The course is designed around a core of general lectures, each supplemented by two to four student presentations, from the recent literature. Topics include, but are not limited to, bone cell ontogeny, integrin/cadherin-based signal transduction, hormonal regulation, and cell:cell communication. Prerequisite: L41 (Bio) 5068 or consent of coursemaster. Credit: 2 units.

**L41 (Bio) 5144 Signal Transduction in Human Biology**

Instructors: Kendall J. Blumer, Ph.D., 362-1668; Anthony J. Muslin, M.D., 747-3525

This course focuses on the human biology of signal transduction in normal and diseased states. It consists of lectures and student presentations. State-of-the-art experimental approaches and linkage between basic and clinical research will be highlighted, showing how multidisciplinary research leads to understanding of disease mechanisms, and improved diagnosis and treatment. The course is

offered spring semester of odd-numbered years. Prerequisite: L41 (Bio) 5068 Fundamentals of Molecular Cell Biology. Credit: 2 units.

#### L41 (Bio) 5171 Medical Immunology

Instructor: Andrey S. Shaw, M.D., 362-4614

An introduction to basic concepts in immunology and immunopathology. Lectures focus on antigen-antibody interactions, immunoglobulin structure and genetics, the cellular basis of the immune response and immune regulation, T cell effector mechanisms, the inflammatory response, complement, the positive and negative roles of hypersensitivity, and immune deficiency. Prerequisite: some background in biochemistry and genetics helpful. Permission of coursemaster. Offered during the first half of the second medical semester. Three-four lecture hours a week, two 2-hour lab periods, four 1-hour clinical discussion groups. Credit: variable, maximum 3 units.

#### L41 (Bio) 5191 Pathobiology of Human Disease States

Instructors: Daniel C. Link, M.D., 362-8771; Hector D. Molina, M.D., 747-0339

Three human disease states will be discussed in detail. Topics will include background clinical and epidemiological information, followed by a detailed examination of the molecular and cellular events that underlie the disease state. Examples of pertinent topics include Alzheimer's disease, AIDS, leukemia, cystic fibrosis, sickle cell anemia, diabetes or lupus. Prerequisite: must be a Markey Pathway student and have HIPAA training. Credit: 2 units.

#### L41 (Bio) 5192 Cancer Biology Journal Club

Instructors: Jason D. Weber, Ph.D., 747-3896

This journal club covers current papers in molecular oncology, cancer genetics and contemporary molecular biology. Presentations will be given by students, post-docs and faculty, then discussed. Credit: 1 unit.

#### L41 (Bio) 5196 Special Emphasis Pathway in Cancer Biology

Instructor: David B. Wilson, M.D., Ph.D., 286-2834

This course is designed to present pre- and postdoctoral trainees with an organized educational format to explore major contemporary topics in cancer biology. The elective will provide an integrated view of cancer research including basic science, translational science, and clinical investigation. Approximately 60 minutes will be devoted to a didactic presentation by a faculty member with interaction by the participants. The remaining 30 minutes will be used to discuss a pivotal research paper from this field, preselected by the faculty member. Outside reading (30-60 min/week) will be required. Credit 2 units.

#### L41 (Bio) 5215 THURSDAY DEVELOPMENT RAVE

Instructor: Kristen Kroll, Ph.D., 362-7045; Ross L. Cagan, Ph.D., 362-7796

Travel the Medical School to gain hands-on experience with new techniques and approaches to developmental biology. We will emphasize a different approach in which doing goes hand-in-hand with asking. Developmental biology can be fun ... so ... no note-taking allowed; we'll give you the notes. Bring your curiosity. Food, beverages and music are all part of the mix. You will learn! Due to the nature of the class, size will be limited. Prerequisite: Graduate standing and coursemaster approval required. Credit: 2 units.

#### L41 (Bio) 5217 Special Topics in Microbial Pathogenesis

Instructors: L. David Sibley, Ph.D., 362-8873; Henry V. Huang, Ph.D., 362-2755

Primarily for graduate and MSTP students, this course involves discussion and oral presentation of current research on pathogenic micro-organisms (bacteria, viruses, parasites, and fungi) and their virulence determinants. Additionally, students will gain practice in how to design and defend research proposals. Emphasis on model systems that demonstrate the cellular and molecular basis of host-pathogen interactions. Prereq: advanced elective course "Molecular Microbiology and Pathogenesis" or permission of instructor. Class meets twice per week for 1.5 hours each. Credit 3 units.

#### L41 (Bio) 5235 Genetics Journal Club

Instructors: Susan K. Dutcher, Ph.D., 362-2765; Mark Johnston, Ph.D., 362-2735

This journal club will be focused on the Genetics Department seminar series. Students will present one or a few recent papers by the seminar speaker scheduled for that week. Students will provide a brief



written evaluation (on a form that will be provided) of their peers' presentations and the faculty advisors will meet with each student after the presentation to provide feedback. Credit: 1 unit.

#### L41 (Bio) 5255 EXPERIMENTAL SKELETAL BIOLOGY JOURNAL CLUB

Instructor: Steven Teitelbaum, M.D., 454-8463

The journal club, which meets weekly, focuses on cellular and molecular biology of the skeleton. Emphasis is placed on gaining insights into normal skeletal homeostasis as well as systemic disorders of bone. Papers presented for review are selected from the most competitive journals. Participants are encouraged to "think outside of the box" and discuss novel molecular discoveries that may impact bone cell function. Credit: 1 unit.

#### L41 (Bio) 5261 Molecular Mechanisms of Immunological Diseases

Instructor: Wayne M. Yokoyama, M.D., 362-9075

Advanced immunology students will be exposed to human diseases that appear to have an immunological basis. In addition to lectures and evaluation of recent clinical and relevant basic immunology literature, an emphasis will be placed on direct encounters with patients and pathologic material when feasible, providing students with a human aspect to discussions of immune pathogenesis. Diseases covered will include those with known causes such as AIDS and autoimmune disorders such as systemic lupus erythematosus and rheumatoid arthritis for which a molecular basis is not fully understood. Other areas may include asthma and tissue transplantation where effector mechanisms are better characterized. Since most of these disorders have no cure or are imperfect clinical entities, the class will discuss research areas that may be fruitful and lead to improved diagnosis and treatment. Prerequisite: Foundations of Immunology or permission of instructor and HIPAA training. Credit: 2 units.

#### L41 (Bio) 5262 HUMAN IMMUNOBIOLOGY

Instructor: Wayne M. Yokoyama, M.D., 362-9075

Advanced immunology students will be exposed to clinical manifestations of human diseases that have an immunological base, such as rheumatoid arthritis, systemic lupus erythematosus, juvenile rheumatoid arthritis, allergy and asthma, by interacting with physicians seeing these patients in the outpatient clinic. Prerequisite: Molecular Mechanisms of Immunological Diseases or consent of instructor and HIPAA training. Credit: 1 unit.

#### L41 (Bio) 5272 Advanced Topics in Immunology

Instructors: Barry P. Sleckman, M.D., Ph.D., 747-8235; Kenneth M. Murphy, M.D., Ph.D., 362-2009

This course uses a journal club format to discuss contemporary issues in the cell and molecular biology of the immune system. Discussions focus on the use of current approaches to analyze the cellular and molecular basis of immunity. Topics include mechanisms of antigenic specificity, diversity, cell communication, differentiation, activation and effector activity. Prerequisite: L41 (Bio) 5051 and permission of instructor. Credit: 2 units. This is referenced in the Department of Pathology and Immunology.

#### L41 (Bio) 5282 Chromatin Structure and Gene Expression

Instructor: Sarah C. R. Elgin, Ph.D., 935-5348

A special topics course covering nucleosome structure, histone modification and chromatin remodeling in gene activation, and epigenetic regulation in yeast, Drosophila, mammals and plants. One-hour review of the topic followed by a one-hour discussion of assigned current literature; emphasis on experimental design. Prerequisite:

#### L41 (Bio) 5284 Current Research in Chromatin, Epigenetics and Nuclear Organization

Instructors: Sarah C.R. Elgin, Ph.D., 935-5348; Douglas L. Chalker, Ph.D., 935-8838

This journal club considers papers from the current literature on chromatin structure and function, with an emphasis on regulation of transcription, epigenetics and genomics. Presentations are given by students, postdocs and faculty, with discussion by all. Students enrolled for credit are expected to attend regularly, and to present a minimum of one paper during the term, with consultation and critique from the faculty. Credit 1 unit.

#### L41 (Bio) 5312 Macromolecular Interactions

Instructor: Timothy M. Lohman, Ph.D., 362-4393

This course will cover equilibria, kinetics and mechanisms of macromolecular interactions from a

quantitative perspective. Thermodynamics, multiple binding equilibria (binding polynomials), linkage phenomena, cooperativity, allostery, macromolecular assembly, enzyme catalysis and mechanism, steady-state and pre-steady state kinetics, and isotope effects. Modern methods of computer analysis using non-linear least squares-fitting and simulation to analyze binding isotherms and full kinetic time courses is emphasized. Prerequisite: Physical Chemistry, Biochemistry, Calculus and Organic Chemistry. Three class hours per week. Credit: 3 units.

**L41 (Bio) 5314 Molecular Biophysics Graduate Seminar**

Instructor: Kathleen B. Hall, Ph.D., 362-4196

Student presentation of molecular biophysics topic. Second-year students present from literature; senior students give formal research seminar. Attendance required for all molecular biophysics students. Credit: 1 unit.

**L41 (Bio) 5316 Intro to Biomolecular Statistical Thermodynamics**

Instructor: Rohit V. Pappu, Ph.D., 362-2057

This course is intended to introduce concepts of statistical thermodynamics to students working or interested in areas of Molecular Biophysics, Biochemistry, Chemical and Biomolecular Engineering and Biotechnology. No prior knowledge will be assumed, although a reasonable foundation in basic calculus and statistics will be useful. The functions of biomolecular machines are intricately determined by the three-dimensional shapes that prevail in an aqueous physiological milieu. How do these shapes come about and how are these shapes used in biological function? A detailed introduction will be provided to the only appropriate framework to study biomolecular folding and binding. The focus will be on water-soluble proteins and RNA. Topics to be covered include: an introduction to concepts in equilibrium statistical physics, concepts of polymer physics and polymer solutions that are applicable to macromolecules, the physics and engineering principles of folding and self-assembly, and the connection between three-dimensional structure and macromolecular function. A combination of molecular simulation and overview of experimental data will be used to illustrate each of the above mentioned concepts. Credit 3 units. Same as home course E72 BME 531.

**L41 (Bio) 5319 Molecular Foundations of Medicine**

Instructor: Linda J. Pike, Ph.D., 362-9502

This course is designed primarily for medical students and will cover fundamental aspects of biochemistry and cell biology. The course begins with a treatment of protein structure and the function of proteins in the cytoskeleton and cell motility. The principles of enzyme kinetics and regulation are then discussed and basic pathways for the synthesis and metabolism of carbohydrates and lipids are introduced. This leads into a discussion of membrane structure and the function of cellular organelles in biological processes including energy production, protein degradation and protein trafficking. Prerequisite: Coursemaster approval is required. This course is cross-listed in the Department of Biochemistry and Molecular Biophysics as M15 502 (Molecular Foundations of Medicine). Credit: 3 units.

**L41 (Bio) 5325 Protein Structure and Function**

Instructor: Jay W. Ponder, Ph.D., 362-4195

The first half of the course covers descriptive amino acid, peptide and protein structure; protein folding, engineering and design; and introductions to enzyme kinetics and thermodynamics protein-ligand interactions. The second half of the course focuses on biophysical methods for the determination and analysis of protein structure and function. These include sections on visible spectroscopy, nuclear magnetic resonance and crystallography. This course is required for the Programs in Biochemistry and in Molecular Biophysics. Prerequisite: undergraduate course in physical chemistry. Credit: 3 units.

**L41 (Bio) 5342 Macrophage Biology**

Instructor: Thomas H. Steinberg, M.D., 362-9218

This special topics course will examine aspects of cell and molecular biology of the macrophage: endocytosis, phagocytosis, adhesion, motility, signal transduction, antigen processing, lysosomes and intracellular parasitism. Prerequisite: Fundamentals of Molecular Cell Biology L41 (Bio) 5068 or Foundations in Immunology L41 (Bio) 5051. Offered in alternate years. Two hours a week. Credit: 2 units.

**L41 (Bio) 5352 Developmental Biology**

Instructor: Kerry Kornfeld, M.D., Ph.D., 747-1480

Analysis of a selected set of key processes in development, such as pattern formation, cell-cell

signaling and morphogenesis. The focus is on molecular approaches applied to important model systems, but framed in classical concepts. Prerequisite: Fundamentals of Molecular Cell Biology (5068) and Nucleic Acids (548). Credit: 3 units.

L41 (Bio) 5384 Advanced Cell Biology

Instructors: Jean E. Schaffer, M.D., 362-8717; Daniel S. Ory, M.D., 362-8737

A lecture/discussion course for graduate and MSTP students that emphasizes current research directions in fundamental processes of cellular biology. Topics will be covered in depth over two-week blocks and will include glycobiology, membranes, extracellular proteolysis, cell communications and contacts, and receptor-mediated endocytosis. Prerequisite: L41 (Bio) 5068 or permission of coursemasters. Credit: 3 units.

L41 (Bio) 5392 Molecular Microbiology and Pathogenesis

Instructor: Michael Caparon, Ph.D., 362-1485

First half focuses on microbial physiology and genetics, with special attention to recent discoveries in gene regulation and protein processing. Second half devoted to microorganisms that cause disease, with emphasis on the molecular interactions between pathogen and host. Prerequisite: first-semester core curriculum for programs in Cell and Molecular Biology. Credit: 3 units. This is referenced in the Department of Molecular Microbiology.

L41 (Bio) 5393 Molecular Virology Journal Club

Instructors: David A. Leib, Ph.D., 362-2689; Andrew S. Pekosz, Ph.D., 747-2132

Journal club with a minimum of one student presentation with faculty critique. Prerequisite: permission of instructor. Credit: 1 unit.

L41 (Bio) 5412 Tropical and Molecular Parasitology

Instructor: L. David Sibley, Ph.D., 362-8873

Graduate level seminar course focusing on current scientific literature in molecular parasitology. The journal club will meet biweekly during the Fall and Spring semesters. Students will attend both semesters in order to receive one credit. The seminar series will run jointly with a research conference in Tropical and Molecular Parasitology. Outside speakers will be invited for the seminar series to emphasize important developments in tropical medicine and molecular parasitology. In advance of the invited speakers, topics will focus on their previous research publications. Prereqs, BIO 5392 Molecular Microbiology & Pathogenesis. Credit 0.5 unit.

L41 (Bio) 5416 Molecular Microbiology and Pathogenesis Journal Club

Instructor: Joseph Vogel, Ph.D., 747-1029

Presentations by students, postdoctoral fellows and faculty on a broad range of topics of current interest, including the fields of molecular mechanisms of pathogenesis, biochemistry, molecular biology, cell biology, developmental biology and immunology. Speakers usually give a brief background to introduce the topic and then focus on one or two papers from the current literature. Credit requires attendance at all sessions and one or two presentations during the year. Credit: 1 unit.

L41 (Bio) 5417 Hematology/Oncology Journal Club

Instructors: Stuart A. Kornfeld, M.D., 362-8803;

Philip W. Majerus, M.D., 362-8801

This journal club, founded in 1966, covers a broad range of topics of current interest, including the fields of biochemistry, molecular biology, cell biology, developmental biology and immunology. Speakers usually give a brief background to introduce the topic and then focus on one or two papers from the current literature. Presentations are given by graduate students, postdoctorate fellows and the faculty. Each attendee presents two to three times per year. Participants are expected to attend all the sessions. Credit: 1 unit.

L41 (Bio) 5419 Seminars in Microbiology AND Infectious Diseases

Instructor: Joseph Vogel, Ph.D., 747-1029

Work-in-progress seminars by graduate students and postdoctoral fellows. Prerequisite: Bio 5392 Molecular Microbiology and Pathogenesis. Credit: 1 unit.

L41 (Bio) 5424 Cellular and Molecular Mechanisms of Infectious Disease

Instructors: David A. Leib, Ph.D., 362-2689; Virginia L. Miller, Ph.D., 286-2891

A series of discussions led by faculty members and visiting faculty, covering topics that range from basic research on microbiology to clinical aspects of infectious diseases. Required for participants in the Infectious Diseases Scholars program at Washington University. Prereqs: BIO 5392 or permission of instructor. Credit 1 unit.

L41 (Bio) 5443 Nucleic Acids and Nucleic Acid Protein Interactions Journal Club

Instructor: Kathleen B. Hall, Ph.D., 362-4196

The biochemistry of nucleic acids and nucleic acid-protein interactions. Focus is on the functional and structural properties of these molecules, addressed through basic biochemical and quantitative approaches. Credit: 1 unit.

L41 (Bio) 5456 Advanced Crystallography

Instructor: Gabriel Waksman, Ph.D., 362-4562

The advanced course in protein crystallography will address all aspects of modern protein crystallography including fundamentals of crystallography, the derivation of the structure factor and electron density equation, symmetry and space groups, direct methods, isomorphous replacement, molecular replacement, data collection and crystal growing theory and techniques. Prerequisites: undergraduate Physical Chemistry and L41 (Bio) 5325 Protein Structure and Function. Two class hours per week. This is referenced in the Department of Biochemistry and Molecular Biophysics. Credit: 2 units.

L41 (Bio) 5466 Current Topics in Biochemistry

Instructor: Kathleen B. Hall, Ph.D., 362-4196

Student presentations of thesis research. Formal presentations require powerpoint. Required of all Biochemistry graduate students; first and second year students get credit. Credit 2 units.

L41 (Bio) 5468 Cardiovascular biophysics journal club

Instructor: Sándor J. Kovács, Ph.D., M.D., 454-7660

This journal club is intended for graduate students with a background in the quantitative sciences (engineering, physics, math, chemistry, etc.). The subjects covered are inherently multidisciplinary. We will review landmark and recent publications in quantitative cardiovascular physiology, mathematical modeling of physiologic systems and related topics such as chaos theory and nonlinear dynamics of biological systems. Familiarity with calculus, differential equations, and basic engineering/thermodynamic principles is assumed. Knowledge of anatomy/physiology is not required. Same as E72 BME 5911. Credit: 1 unit.

L41 (Bio) 5472 CARDIOVASCULAR MRI — FROM PHYSICS TO CLINICAL APPLICATION

Instructor: Samuel A. Wickline, M.D., 454-5539

This graduate course (seniors welcome) will cover the basic physics involved in creating an image by magnetic resonance technology. The use of this technology, specifically as it applies to the unique challenges of cardiovascular applications, will be examined. This will include topics such as motion compensation techniques, real-time imaging, exogenous contrast enhancement, and quantitative flow measurements, for example. As much as one-third of the class will involve actual case studies and the discussion of clinical use for cardiovascular MRI. Students will demonstrate competence in the subject through a combination of homework, a final exam-ination, and a small semester project. Prerequisite: Calculus, introductory human physiology/anatomy/biology course. Same as E62 BME 502. Credit: 3 units.

L41 (Bio) 5474 ALGORITHMS FOR COMPUTATIONAL BIOLOGY

Instructor: Michael R. Brent, Ph.D., 935-6621

This course will focus on how to sequence and analyze a genome, emphasizing computational and algorithmic issues. After taking this course, you should be able to parachute into a genome informatics group, understand what's going on, and do something useful on your first day. Topics covered include: the essential biology, the essential probability theory, base calling and quality clipping, genome assembly (including aspects of sequence alignment), repeat masking, predicting protein-coding genes (including Hidden Markov Models and comparative genomics approaches), predicting gene function by comparing to proteins of known function, basic RNA gene finding, and advanced topics in sequence alignment. This course will include a combination of paper-and-pencil homework assignments and programming labs. Prerequisite: CS 241 or CS 514N or L41 (Bio) 5495. Same as E61 CS 547T. Credit:

3 units.

L41 (Bio) 5476 Modeling Biomolecular Systems I

Instructor: Jay W. Ponder, Ph.D., 362-4195

This course covers the applications of computer modeling and simulation to problems involving biological macromolecules. Lectures will discuss the theory and algorithms underlying a variety of simulation techniques. Laboratory exercises and a student project will provide experience with software presently used in the field. Topics examined in detail include: computational tools, molecular visualization, simulation methodology, force field methods, optimization, experimental design, QSAR, scoring and screening of ligands, docking, structure databases, and refinement and prediction of structures. Prereqs: basic background in biochemistry and physical chemistry; ability to write simple computer programs in any language. Credit 3 units. Same as E62 BME 530.

L41 (Bio) 5477 Modeling Biomolecular Systems II

Instructor: David Sept, Ph.D., 935-8837

This course is a continuation of BME 530/BIO 5476 covering additional topics in computer modeling and simulation. The lectures will cover the theory and underlying algorithms, while the laboratories and term project will provide the students with hands-on experience in using various software packages. Topics will include: statistical mechanics concepts in molecular simulations; algorithms for molecular dynamics, stochastic dynamics and Monte Carlo simulations; free energy calculations; electrostatics and continuum solvation methods; hybrid QM/MM calculations; multi-scale modeling. Prereqs: A background in biochemistry and physical chemistry. Credit 3 units. Same as home course E62 BME 540.

L41 (Bio) 5478 Biomolecular NMR

Instructor: David P. Cistola, M.D., Ph.D., 362-4382

This advanced elective will cover some of the basic concepts and experiments used for characterizing biological macromolecules using multi-dimensional NMR spectroscopy. Topics will include fundamental concepts such as spin echoes, polarization transfer, multiple-quantum NMR, as well as experimental and practical considerations in characterizing the structures and dynamics of macromolecules. Prereqs: Bio 5325 or permission of instructor. Credit 3 units.

L41 (Bio) 548 Nucleic Acids and Protein Biosynthesis

Instructor: John E. Majors, Ph.D., 362-1135

Fundamental aspects of structure, biosynthesis and function of nucleic acids and the biosynthesis of proteins. Emphasis on mechanisms involved in the biosynthetic processes and the regulation thereof. Prerequisite: L41 (Bio) 337, 449, or equivalent or permission of instructor. This is referenced in the Department of Biochemistry and Molecular Biophysics. Credit: 3 units.

L41 (Bio) 5481 Student-Run Molecular Genetics Journal Club

Instructor: John E. Majors, Ph.D., 362-1135

Students in the Molecular Genetics Program have organized this journal club, which meets weekly. The speaker provides the faculty member in charge with a one-page outline of their presentation ahead of the class time. Students provide written evaluations of the quality and content of each others' talks. The forms are given to each speaker by way of the faculty member in charge. All students receiving credit are expected to give one presentation per semester and to attend regularly. This is referenced in the Department of Biochemistry and Molecular Biophysics. Credit: 1 unit.

L41 (Bio) 5482 Human Linkage and Association Analysis

Instructor: Anne Bowcock, Ph.D., 747-3264

Meiosis, inheritance, Hardy Weinberg Equilibrium, Linkage: definition, crossing over, map functions, phase, LOD scores, LINKAGE, genetic heterogeneity, penetrance, phenocopies, and liability classes, multipoint analysis, non-parametric analysis (sibpairs and pedigrees), quantitative trait analysis, determination of power for mendelian and complex trait analysis, linkage disequilibrium analyses, allelic association (case control designs and family bases studies). Twenty-four hours of lectures; six hours of student presentations. Credit: 2 units. Same as M21 GEMS 5482.

L41 (Bio) 5484 Genetics AND Development of C. Elegans Journal Club

Instructor: Tim Schedl, Ph.D., 362-6162

Students will present a research paper (or present their current thesis research) and the appropriate background material. Credit: 1 unit.

L41 (Bio) 5486 CLASSIC EXPERIMENTS IN MOLECULAR BIOLOGY

Instructors: Susan K. Dutcher, Ph.D., 362-2765; Sean R. Eddy, Ph.D., 362-7666; Mark Johnston, Ph.D., 362-2735

A few key papers stand out as the historical foundations of molecular genetics. They illuminate the process of intuition, creative experimentation and insight that led to what we now accept as dogma in our field. This class, organized in the style of a journal club, will explore this history through presentations by students of these classic papers. Each student will be responsible for presenting one topic, consisting of two to three papers, placing them in their historical context through background reading from the contemporary literature. Prerequisite: Graduate standing and L41 (Bio) 548 and L41 (Bio) 5491, or consent of instructors. Credit: 1 unit.

L41 (Bio) 5488 Genomics

Instructors: Tim Schedl, Ph.D., 362-6162; Barak A. Cohen, Ph.D., 362-3674

A hybrid of concepts and practical applications in genomics. Areas covered include how genomes are mapped and sequenced, computational methods for gene predictions, functional genomic techniques for ascribing function to DNA, RNA and protein sequence and how genomic techniques and resources can advance the study of human disease. Heavy emphasis will be placed on students acquiring basic skills needed to navigate and manipulate databases of DNA sequence, gene expression and other types of genome wide data. Prerequisites: Molecular Cell Biology (Bio 5068), Nucleic Acids (Bio 548) or by permission of instructor. Lecture 3 units of credit, lab one additional unit, space limited. Credit: 3 or 4 units.

L41 (Bio) 5491 Advanced Genetics

Instructor: James B. Skeath, Ph.D., 362-0535

Fundamental aspects of organismal genetics with emphasis on experimental studies that have contributed to the molecular analysis of complex biological problems. Examples drawn from bacteria, yeast, nematodes, fruit flies and mammalian systems. Prerequisite: graduate standing or permission of instructor. This is cross-listed in the Department of Genetics. Credit: 3 units.

L41 (Bio) 5493 Subversive Genetics, Attacks on the Central Dogma

Instructor: Stephen L. Johnson, Ph.D., 362-0362

Exceptions to the central dogma of genetics and molecular biology are identified and examined. Particular care is paid to identifying strategies to resolve mechanistic bases of these phenomena. Prereqs, Advanced Genetics. Credit 2 units.

L41 (Bio) 5495 Computational Molecular Biology

Instructor: Sean R. Eddy, Ph.D., 362-7666

A detailed survey of the mathematical and algorithmic basis for methods in computational molecular biology. Topics covered include sequence alignment algorithms, multiple sequence alignment, RNA structure prediction, motif and pattern searches, and phylogenetic inference. Two lectures per week, plus a discussion section each week in which students present a current paper in the field. Students will acquire a working knowledge of UNIX and the C programming language during the course. There are no formal prerequisites, but an aptitude for mathematics and computer programming is essential. The course is generally too advanced for biologists simply seeking to learn how to use common bioinformatics tools. Same as E62 BME 537. Credit: 3 units.

L41 (Bio) 5496 Seminar in Computational Molecular Biology

Instructor: Jeremy Buhler, Ph.D., 935-6180

Computational methods in molecular biology. Focus is on novel methods and recent contributions in computational genomics, proteomics and transcriptomics. Same as E61 CS 7801. Credit: 1 unit.

L41 (Bio) 5497 Special Topics in Computational Molecular Biology

Instructor: Gary D. Stormo, Ph.D., 747-5534

In-depth discussion of problems and methods in computational molecular biology. Each year, three topics will be covered, and those will change yearly. Prerequisite: L41 (Bio) 5495 or instructor's consent. Same as E71 CS 583A. Credit: 2 units.

L41 (Bio) 550 Medical Genetics

Instructor: Alison J. Whelan, M.D., 362-8050

Topics covered include population and quantitative genetics, clinical cytogenetics, biochemical genetics and metabolic defects. Lectures, clinics and small group discussions. Prerequisite: an introductory genetics course and permission of the instructor. This is cross-listed in the Department of Genetics as M30 511 Medical Genetics. Credit: 2 units.

L41 (Bio) 5511 Molekoolz

Instructors: Tanya Wolff, Ph.D., 362-1509; Jason D. Weber, Ph.D., 747-3896

Come join us as we explore the latest in a wide range of research areas. Invited speakers will discuss topics from RNA to proteins, signals to receptors, cells to tissues, and everything in between. All are welcome, but lectures will be aimed at advanced graduate students and post-docs. Students taking the course for credit will be expected to read one paper per topic. Credit 2 units.

L41 (Bio) 554 Neural Sciences

For full description, see the Department of Anatomy and Neurobiology, M35 554 Neural Sciences.

L41 (Bio) 5564 Topics in Neural Engineering: Sensorimotor Systems and Computations

Instructors: Dora E. Angelaki, Ph.D., 747-5529; Gregory C. Deangelis, Ph.D., 747-2253; Lawrence Hugh Snyder, M.D., Ph.D., 747-3530

Sensorimotor computations provide one of the best opportunities for understanding a fundamental question about brain function: how are sensory signals transformed into motor commands? This course will address the basic physiological organization and function of sensory and motor areas of the brain, with a strong emphasis on computational aspects of brain function and on quantitative/engineering approaches to their study. The course will consist of a set of lectures as well as interactive student-faculty discussions of current and classical literature. Special focus will be on eye movements, as well as the visual and vestibular systems. The course is mainly designed for graduate students in physical sciences and engineering (e.g., mainly Biomedical Engineering) or Systems Neuroscience. Prereqs: Bio 5651. Seniors with a good quantitative background are also welcome if they have taken EE379 and BME301 or with special permission from one of the instructors. A good handle of calculus and differential equations, as well as a background in Fourier analysis, signal processing and frequency domain representations are required. Class meets in 2nd floor conference room in E. McDonnell Bldg, Medical School campus. Credit 3 units. Same as home course E62 BME 573.

L41 (Bio) 5565 Oral Presentation of Scientific Data

Instructor: Staff, Anatomy and Neurobiology, 362-3363

Practical course on how to prepare and present scientific data to an audience, either as a seminar or as a course lecture. Prerequisite: first-year neuroscience program courses. Credit: 1 unit.

L41 (Bio) 5571 Cellular Neurobiology

Instructor: Jim Huettnner, Ph.D., 362-6624

This course will present a fully integrated overview of nerve cell structure, function and development at the molecular and cellular level. Broad topics to be covered include gene structure and regulation in the nervous system, quantitative analysis of voltage- and chemically-gated ion channels, presynaptic and postsynaptic mechanisms of chemical neurotransmission, sensory transduction, neurogenesis and migration, axon guidance and synapse formation. Ten lectures plus four hours of discussion per week for six weeks. There will be two exams and a written research proposal, as well as homework problems and summaries of discussion papers. Prerequisite: graduate standing or permission of the instructor. Credit: 6 units.

L41 (Bio) 5606 COGNITIVE NEUROSCIENCE OF HUMAN MEMORY

Instructor: Randy L. Buckner, Ph.D., 935-5019

A survey of issues related to the cognitive neuroscience of human memory will be discussed including working and long-term memory. Reading will consist of classic works by James, Fuster, Goldman-Rakic, Milner, and Squire as well as many contemporary articles that highlight hot issues and new techniques. Requirements will include readings, attendance, brief presentations, and active participation in classroom discussion. Prerequisite: graduate standing. Same as L33 (Psych) 5090. Credit: 3 units.

L41 (Bio) 5628 Classic Papers on Memory (and the Ones That Got Away)

Instructor: Randy L. Buckner, Ph.D., 935-5019

Classic articles in memory will be discussed in the context of why they are seminal to the field. By covering these, students are expected to obtain a broad survey of important works in memory research. Topics will include amnesia, LTP, levels of processing, implicit memory, false memory, brain imaging and others. Within each topic, articles that are less seminal, but reported at about the same time, will also be discussed. A goal of the class will be to debate what specifically allowed the classic articles to change the way we think. What sets them apart? Requirements will include attendance, class participation, and periodic brief class presentations. Prerequisite: Graduate standing or permission of instructor. Same as L33 Psych 4629.

L41 (Bio) 5641 Computational Neuroscience

Instructor: Charles H. Anderson, Ph.D., 362-1799

This course presents a unifying framework for quantitative modeling of neurobiological systems based on fundamental principles of systems engineering as described in the book "Neural Engineering," MIT Press 2003, by Chris Eliasmith and Charles H. Anderson. Students will have to read and discuss this book, as well as build and run simulations of neuronal circuits using Matlab. One 1 1/2 hour lecture a week plus another 1 1/2 hour discussion period. Credit 3 units. Same as E62 BME 5641.

L41 (Bio) 5651 Neural Systems

Instructor: Gregory C. DeAngelis Ph.D., 747-2253

The course will consist of lectures and discussions of the sensory, motor and integrative systems of the brain and spinal cord, together with a weekly lab. The lectures will present aspects of most neural systems, and will be given by faculty members who have specific expertise on each topic. The discussions will include faculty-led group discussions and papers presented and discussed by students. The labs will include human brain dissections, examination of histological slides, physiological recordings, behavioral methods, computational modeling and functional neural imaging. Credit: 4 units.

L41 (Bio) 5657 Biological Neural Computation

Instructor: Kurt A. Thoroughman, Ph.D., 935-9094

This course will consider the computations performed by biological nervous systems. Readings and discussions will investigate the physiological bases of computations made by ion channels, synapses, dendrites, neurons and neuronal networks. Readings will include classic and current primary research papers. Computer laboratories will determine how simple mathematical models succeed or fail to represent observed biological function. Prerequisites: calculus, some experience with differential equations, cell or organismal biology. Same as E72 BME 590Q.

L41 (Bio) 5662 Biological Applications of Optical Microscopy

Instructor: Mark P. Goldberg, M.D., 362-3258

Introduction to the light microscope as a tool for innovative research in cell biology and neuroscience. Topics include optical microscope theory, electronic image acquisition and analysis, fluorescent probes for intracellular ions such as calcium and confocal microscopy. Seminar format with faculty and student participation. Prerequisite: graduate standing or permission of instructor. Audit only by prior arrangement with instructor. Two class hours per week. Credit: 2 units.

L41 (Bio) 5663 Neurobiology of Disease

Instructors: Bradley L. Schlaggar, Ph.D., 454-6120; Mark P. Goldberg, M.D., 362-3258

This is an advanced graduate seminar on the neuroscience of nervous system disorders. This course is intended to acquaint basic scientists with a spectrum of clinical diseases, and to consider how advanced neuroscience approaches may be applied to promoting recovery in the brain. The class will meet for 2 1/2 hours each week. Each session will be led by a faculty guest with expertise in a specific neurological or psychiatric disease. In the first hour, the speaker will discuss clinical manifestations and pathophysiology. Where possible, the clinical presentation will be supplemented with a patient demonstration or videotape. The second hour will follow a journal club format. Two or three students will review current papers assigned by the speaker or course director. This course is offered in alternate years. Credit 2 units.

L41 (Bio) 572 Seminar in Plant Biology



Instructor: Eric J. Richards, Ph.D., 935-7196

A weekly discussion of modern research in plant biology including topics in molecular genetics, development, biochemistry, physiology, population dynamics and plant-pathogen interactions. Research seminars by local and outside speakers will be intermixed with journal club presentations in alternating weeks. Credit will be contingent on one journal club presentation per semester, regular attendance and active participation in group discussions. Credit: 2 units.

L41 (Bio) 580 Seminar in Population Biology

Instructor: Allan Larson, Ph.D., 935-4656

This weekly seminar, covering different topics each semester, should be taken by graduate students in the program. Prerequisite: graduate standing or permission of the instructors. Credit: variable, 2 or 3 units.

L41 (Bio) 582 Ethnobiology Journal Club

Instructor: Gayle J. Fritz, Ph.D., 935-8588

Students in this journal club will meet weekly with ethnobotanists, ethnozoologists, and ecologists from various St. Louis institutions (including Washington University, UM-St. Louis, St. Louis University, and the Missouri Botanical Garden) to discuss recent publications and ongoing research. Enrolled students will attend the journal club every week, and once per semester, will choose a paper and lead the discussion. Credit 1 unit. Same as home course L48 Anthro 560.

L41 (Bio) 585 Seminar in FloristicTaxonomy

Instructor: P. Mick Richardson, Ph.D., 577-5176

A survey of angiosperm families, their morphology, cytology, anatomy, palynology, chemistry and evolution. Prerequisite: L41 (Bio) 4132 or equivalent. Credit: 1 unit.

L41 (Bio) 590 Research

Instructors: Staff, Division of Biology and

Biomedical Sciences, 362-3365

Credit to be arranged. Research is listed as 900-level course in each department.

L41 (Bio) 5911 Seminar in Biology and Biomedical Sciences

Instructors: Staff, Division of Biology and

Biomedical Sciences, 362-3365

These seminars cover the recent literature in various areas not included in other courses, or in more depth than other courses. Credit to be arranged.

L41 (Bio) 5915 Teaching Practice in Biology and Biomedical Sciences

Instructor: John H. Russell, Ph.D., 362-2558

Students serve as teaching assistants for undergraduate and graduate-level courses.

Faculty-supervised activities include lecture presentation, leading discussion and problem-solving sessions and laboratory instruction. Prerequisite: restricted to graduate students in the Division of Biology and Biomedical Sciences. Credit: 1 unit.

L41 (Bio) 5999 Independent Work

Instructors: Staff, Division of Biology and Biomedical Sciences, 362-3365

This course is designed for individual students wishing to explore in-depth specialized areas of literature or technology with one or more faculty members. Credit will vary with the amount of work and discussion, but cannot be more than 3 credits. Credit: Variable, maximum 3 units.

Note — The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences.

## **Biomedical Engineering**

Biomedical engineering is the integration of engineering methods with biological science and medical practice. It strives to provide increased quantitative and analytical understanding of complex living organisms. Through this increased understanding, biomedical engineers can contribute to advances in biomedical research and to improvements in health care.

In many areas of medicine and biology, advances are being driven by technology. For example, modern computer technology is fundamental to the new fields of computational molecular biology, genome analysis and computational neuroanatomy. Systems approaches are increasingly important to advancing knowledge of many biological processes. Other facets of biomedical engineering will lead to improved diagnostic and therapeutic agents, improved prostheses, and new approaches to tissue and organ repair including the use of bio-resorbable materials, reconstituted tissue and regenerated cells. With the increased understanding that comes from scientific research and the tools of biomedical engineering, a bountiful era of increased understanding of disease, health care informatics, new biomaterials, and revolutionary medical devices can be realized.

Biomedical engineering has been a focus of activity for almost 40 years in both the School of Engineering and Applied Science and the School of Medicine at Washington University in St. Louis. Contributions of the university include advances in imaging technologies for biology and medicine; positron emission tomography, confocal optical microscopy, advanced ultrasound imaging, magnetic resonance imaging and X-ray tomography. The university has played a leading role in applying high-speed communications systems to transmit scientific and medical information. Furthermore, the university is recognized worldwide for its work in mapping and sequencing the human genome, in computational molecular biology, in mapping of the human brain, and in cardiovascular engineering.

Biomedical engineering is an extremely diverse field encompassing the activities of faculty at Washington University in departments at the medical school as well as the engineering school. Recognizing the strength and diversity of existing programs, the Department of Biomedical Engineering was established on July 1, 1997. Together with the newly established Institute of Biomedical and Medical Engineering, involving faculty from the School of Engineering and Applied Science, the School of Medicine and also from the College of Arts & Sciences, this network facilitates and promotes the graduate educational training of biomedical engineers at Washington University. The Executive Council of the Institute, with broad representations from both the School of Engineering and Applied Science and the School of Medicine, has the responsibility to facilitate and coordinate student access to these various research opportunities. A graduate committee composed of members of the full-time faculty and the Institute determines the guidelines for graduate students in biomedical engineering.

The goals of graduate education in Biomedical Engineering at Washington University are to continue the University's innovative and nationally recognized research programs and to train a new generation of leaders who apply engineering science throughout biology and medicine in government, industry and academia. This is a broad vision of biomedical engineering as a field and defines a role for which Washington University is ideally suited.

## **Link to Website**

<http://biomed.wustl.edu/graduate/>

## **Courses**

BME 500 Independent Study  
BME 501 Graduate Seminar  
BME 502 Cardiovascular MRI—From Physics to Clinical Application  
BME 503A Cell and Organ Systems Biology  
BME 5068 Fundamentals of Molecular Cell Biology  
BME 530 Modeling Biomolecular Systems I  
BME 531 Introduction to Biomolecular Statistical Thermodynamics  
BME 533 Biomedical Signal Processing  
BME 537 Computational Molecular Biology  
BME 537A Intensive Course in Computational Molecular Biology  
BME 546 Algorithms for Computational Biology  
BME 5494 Quantitative Cardiovascular Physiology  
BME 557 Cellular and Subcellular Biomechanics  
BME 558 Biological Transport  
BME 559 Introduction to Biomechanics

BME 560A Biomechanics  
BME 562 Mechanics of Growth and Development  
BME 5641 Computational Neuroscience  
BME 566 Cardiac Electrophysiology  
BME 567 Cardiovascular Engineering II: Cardiac Mechanics  
BME 568 Cardiovascular Dynamics  
BME 573 Special Topics: Topics in Neural Engineering, Sensorimotor Systems and Computations  
BME 582A Instrumentation  
BME 590A Special Topics in Biomedical Engineering  
BME 590B Special Topics: Medical Computer Vision  
BME 590C Cardiovascular Magnetic Resonance Imaging  
BME 590F Special Topics: Cell and Tissue Engineering  
BME 590H Special Topics: Introduction to Biomaterials Science  
BME 590K Nonlinear Elasticity in Biomechanics  
BME 590L Special Topics: Engineering Aspects of Biotechnology  
BME 590N Special Topics: Modeling Biomolecular Systems  
BME 590P Polymer Principles in Protein Structure  
BME 590Q Biological Neural Computation  
BME 590R Introduction to Biomechanics  
BME 590S Special Topics: Tissue Engineering  
BME 590T Applied Neural Communication and Control  
BME 590U Special Topics: Biotechnology Techniques for Engineers  
BME 590X Special Topics: Design of Artificial Organs  
BME 590Z Special Topics: Musculoskeletal Biomechanics  
BME 5911 Cardiovascular Biophysics Journal Club  
BME 599 Master's Research  
BME 600 Doctoral Research

For additional related courses, see the Bulletin of the School of Engineering and Applied Science.

## **Faculty**

### **Professor and Chairman of Department**

Frank Chi-Pong Yin, Ph.D.,  
University of California, San Diego, 1970; M.D., 1973.

### **Professors Emeriti**

Harold W. Shipton, C.Eng.,  
Shrewsbury Technical College, 1949.

Salvatore P. Suter, Ph.D.,  
California Institute of Technology, 1960.

Lewis J. Thomas Jr., M.D.,  
Washington University 1957.

### **Professors**

R. Martin Arthur, Ph.D.,  
University of Pennsylvania, 1968.

Philip V. Bayly, Ph.D.,  
Duke University, 1993.

G. James Blaine III, D.Sc.,  
Washington University, 1974.

John P. Boineau, M.D.,  
Duke University, 1959.

Harold Burton, Ph.D.,

University of Wisconsin, 1968.

Michael E. Cain, M.D.,  
George Washington University, 1975.

Sean R. Eddy, Ph.D.,  
University of Colorado, 1991.

Elliot L. Elson, Ph.D.,  
Stanford University, 1966.

William A. Frazier III, Ph.D.,  
Washington University, 1973.

Bijoy K. Ghosh, Ph.D.,  
Harvard University, 1983.

Stephen M. Highstein, M.D.,  
University of Maryland Medical School, 1965; Ph.D., University of Tokyo Faculty of Medicine, 1976.

Jeffery W. Lichtman, M.D., Ph.D.,  
Washington University, 1980.

Daniel A. Low, Ph.D.,  
Indiana University, 1988.

Garland R. Marshall, Ph.D.,  
Rockefeller University, 1966.

Robert P. Mecham, Ph.D.,  
Boston University, 1976.

James G. Miller, Ph.D.,  
Washington University, 1969.

Thomas R. Miller, M.D.,  
University of Missouri, 1976.

Michael K. Pasque, M.D.,  
University of Oklahoma, 1978.

Marcus E. Raichle, M.D.,  
University of Washington, 1964.

Carl M. Rovainen, Ph.D.,  
Harvard University, 1967.

Yoram X. Rudy, Ph.D.  
Case Western Reserve University, 1978.

Donald L. Snyder, Ph.D.,  
Massachusetts Institute of Technology, 1966.

Joseph H. Steinbach, Ph.D.,  
University of California, San Diego, 1973.

Gary D. Stormo, Ph.D.,  
University of Colorado, 1981.

Barna A. Szabo, Ph.D.,  
State University of New York, 1969.

Larry A. Taber, Ph.D.,  
Stanford University, 1979.

Alan R. Templeton, Ph.D.,  
University of Michigan, 1972.

W. Thomas Thach Jr., M.D.,  
Harvard University, 1964.

David C. Van Essen, Ph.D.,  
Harvard University, 1971.

Michael J. Welch, Ph.D.,  
University of London, 1965.

Thomas A. Woolsey, M.D.,  
The Johns Hopkins University, 1969.

### **Professor (Adjunct)**

Gary Brandenburger, D.Sc.,  
Washington University, 1973.

### **Research Professors**

Charles H. Anderson, Ph.D.,  
Harvard University, 1962.

Julius Goldstein, Ph.D.,  
University of Rochester, 1965.

### **Associate Professors**

Amir Arsham Amini, D.Sc.,  
University of Michigan, 1990.

Dora Angelaki, Ph.D.,  
University of Minnesota, 1991.

Michael R. Brent, Ph.D.,  
Massachusetts Institute of Technology, 1991.

Paul C. Bridgman, Ph.D.,  
Purdue University, 1980.

Andreas H. Burkhalter, Ph.D.,  
University of Zurich, 1977.

Jianmin Cui, Ph.D.  
State University of New York Stony Brook, 1992.

Igor R. Efimov, Ph.D.  
Moscow Institute of Science and Technology, 1992.

Daniel R. Fuhrmann, Ph.D.,  
Princeton University, 1984.

Robert J. Gropler, M.D.,  
University of Cincinnati, 1981.

Sándor J. Kovács, Ph.D.,  
California Institute of Technology, 1977; M.D., University of Miami, 1979.

Stanley Mislér, Ph.D.,  
New York University, 1976; M.D., 1978.

Joseph A. O'Sullivan, Ph.D.,  
University of Notre Dame, 1986.

Steven E. Petersen, Ph.D.,  
California Institute of Technology, 1982.

William D. Richard, Ph.D.,  
University of Missouri, Rolla, 1988.

Frederick U. Rosenberger, D.Sc.,  
Washington University, 1969.

Jin-Yu Shao, Ph.D.,  
Duke University, 1997.

Matthew J. Silva, Ph.D.,  
Massachusetts Institute of Technology, 1996.

M. Victor Wickerhauser, Ph.D.,  
Yale University, 1985.

Samuel A. Wickline, M.D.,  
University of Hawaii, 1980.

### **Research Associate Professors**

Jack R. Engsberg, Ph.D.,  
University of Iowa, 1985.

Joseph W. Klaesner, Ph.D.,  
Vanderbilt University, 1995.

Richard B. Schuessler, Ph.D.,  
Clemson University, 1977.

### **Assistant Professors**

Kyongtae T. Bae, Ph.D.,  
University of Pennsylvania, 1988; M.D., The University of Chicago, 1992.

Thomas E. Conturo, M.D., Ph.D.,  
Vanderbilt University, 1989.

Nathan A. Baker, Ph.D.,  
University of California, San Diego, 2001.

Dennis L. Barbour, M.D., Ph.D.,  
The Johns Hopkins University, 2003.

P. Duffy Cutler, Ph.D.,  
University of California, Los Angeles, 1992.

Gregory C. DeAngelis, Ph.D.,  
University of California, Berkeley, 1992.

Robert H. Deusinger, Ph.D.,  
University of Iowa, 1981.

Donald L. Elbert, Ph.D.,  
University of Texas, Austin, 1997.

James E. Huettner, Ph.D.,  
Harvard University, 1987.

Gregory M. Lanza, Ph.D.,  
University of Georgia, 1981.

Timothy J. McCarthy, Ph.D.,

University of Liverpool, 1989.

Scott D. Minor, Ph.D.,  
University of Iowa, 1987.

Daniel W. Moran, Ph.D.,  
Arizona State University, 1994.

Michael J. Mueller, Ph.D.,  
Washington University, 1992.

Ruth Okamoto, D.Sc.,  
Washington University, 1997.

Rohit V. Pappu, Ph.D.,  
Tufts University, 1996.

Jay W. Ponder, Ph.D.,  
Harvard University, 1984.

Shelly E. Sakiyama-Elbert, Ph.D.,  
California Institute of Technology, 2000.

David S. Sept, Ph.D.,  
University of Alberta, 1997.

Kurt A. Thoroughman, Ph.D.,  
The Johns Hopkins University, 1999.

Nikolaos V. Tsekos, Ph.D.,  
University of Minnesota, 1995.

Jerold W. Wallis, M.D.,  
Stanford University, 1981.

### **Research Assistant Professors**

John M. Ollinger, D.Sc., Ph.D.,  
Washington University, 1986.

Xin Yu, Sc.D.,  
Massachusetts Institute of Technology, 1996.

DeQuan Zou, D.Sc.,  
Washington University, 1993.

## **Health Administration**

### ***Philosophy***

The faculty of the Health Administration Program of Washington University believes that administrative personnel in health organizations require not only a solid foundation in management, but also an understanding of those aspects of finance, regulation and strategic planning unique to the health care field. Since its inception in 1946, the Program has acted on the premise that health administration students would benefit from exposure to the environment in which they ultimately will work. To this end, the Program has maintained an organizational structure consisting of a core faculty located within the School of Medicine, augmented by faculty from other schools and departments within the university, as well as affiliated institutions and agencies. This multidisciplinary approach enables the student to acquire not only management knowledge and skills, but also an understanding of the many complexities unique to the health care sector.

### ***Curriculum and Sequence of Study***

Required courses constitute 70 percent of the course sequence for the Master of Health Administration degree, offering vital exposure to the generic knowledge in the health administration area. In addition to the elective courses available within the Health Administration Program (HAP), students may take up to 15 semester hours of graduate work in other units of Washington University. The HAP student's faculty adviser must approve the selection of courses in the student's individual curriculum. The student's previous academic work, employment experience and ultimate professional goals enter into the individual's personalized curriculum.

As a means of furthering interdisciplinary study, up to 15 semester hours of HAP courses are open to interested graduate students from other areas of Washington University. There is also a dual M.H.A.-J.D. degree with the School of Law, a dual M.H.A.-M.B.A. degree with the Graduate School of Business Administration, a dual M.H.A.-M.I.M. degree with the School of Engineering, and a dual M.H.A.-M.S.W. degree with George Warren Brown School of Social Work. A dual degree is also offered with the School of Arts and Sciences in Human Resource Management (M.H.A.-M.A.) through University College. Medical students interested in attaining the M.H.A. degree can complete one semester of required HAP courses as part of their fourth-year electives. The remaining three semesters of HAP courses can then be completed after the student has attained his/her M.D. degree.

The sequence of study requires two years, each consisting of a fall and spring semester. Upon completion of the four semesters, or a total of 60 units, the student will receive a master's of health administration (M.H.A.) degree. The statute of limitations is five years from the date of matriculation to complete all requirements for the M.H.A. degree. Contingent upon graduation, the student has the option of pursuing a 12-24 month postgraduate administrative fellowship. A certificate will be awarded by Washington University School of Medicine and the affiliated fellowship organization upon its satisfactory completion.

### ***Administrative Fellowship***

The 12-24 month optional postgraduate administrative fellowship will be served in a hospital, health agency, health organization or health system that has been recommended and approved by the full-time faculty. This option is available only to those persons who have the M.H.A. degree conferred upon them by the Washington University Health Administration Program. The purpose of the fellowship is to provide the graduate with an opportunity to observe and practice those concepts and principles learned during the didactic on-campus exposure. The administrative fellowship is strongly recommended, as this postgraduate practical exposure is deemed necessary for adequate professional career preparation. The fellowship is completed under the direction of a well-qualified and experienced health care executive.

The full-time faculty maintains close liaison with the administrative fellow and the preceptor. An educational plan that outlines the fellow's activities for the coming year must be filed by the fellow, and the fellow reviews his/her learning progression at the end of the fellowship in a report to HAP's director. The preceptor sends two evaluation reports to the director of HAP and shares the responsibility for recommending awarding of the certificate by Washington University School of Medicine and the fellowship site organization.

### ***Admission Requirements***

Washington University's Health Administration Program is committed to nondiscriminatory practices in selection of applicants regarding race, sex, age, religion or national origin. The faculty and staff are affirmatively committed to recruiting, enrolling and educating students from minority groups who have the potential for graduate study.

A minimum of a bachelor's degree from an accredited university or college acceptable to Washington University School of Medicine is required, as is completion of the Graduate Record Examination (Aptitude Test) or the Graduate Management Aptitude Test. International students are also required to take the TOEFL exam. No specific undergraduate major field of study is required for admission into the program; however, at least one semester of accounting is required and introductory courses in economics, statistics (or their equivalents) and mathematics through college algebra are very strongly recommended. An on-site interview is required.

Tuition per semester	\$11,750
Books and supplies (per semester)	\$625



Application fee (nonrefundable)

\$30/U.S., \$50/International

## **Link to Website**

<http://hap.wustl.edu/>

## **Courses**

### ***Fourth Year***

#### **Medical Student Elective**

M80 856 Health Administration I

This elective is described in the Teaching and Research Divisions, and Programs chapter.

## **Faculty**

**STUART B BOXERMAN, D SC** Director of the Health Administration Program, Associate Professor of Health Administration

**SIMONE MARIE CUMMINGS, PHD** Instructor in Health Administration

**WILLIAM C DUNAGAN, MD** Instructor in Health Administration

**DAVID ALAN GEE, MS** Professor Emeritus of Health Administration (Jewish Hospital)

**RONALD E GRIBBINS, PHD** Adjunct Assistant Professor of Health Administration

**JAMES O HEPNER, PHD** Professor Emeritus of Health Administration

**DENNIS LEE LAMBERT, PHD, MS, MS** Instructor in Health Administration

## **Health Care Services**

The Health Care Services Program at Washington University responds to the growing need for interdisciplinary professionals with expertise in the planning, implementation and evaluation of health service programs. Sponsored jointly by Washington University's School of Medicine, Department of Psychology and University College, this 30-unit graduate degree program draws on the broad expertise of university faculty and research personnel. The curriculum examines organizational influences important to the development of innovative programs for individuals and families, stressing health education and the application of current research findings.

Admission to the Health Care Services Program is open on a selective basis to qualified applicants with a bachelor's degree in a science or health-related field from an accredited institution. Applicants should have completed training in one of the several professions involved in the health care environment. Others may be admitted whose training and goals are congruent with the purposes of the program and acceptable to the admissions committee. The Master of Health Science degree can be pursued on a part-time basis with most courses held during the late afternoon or evening hours to accommodate the working professional. Students may select electives from various departments and divisions of the university (health administration, social work, psychology, human resources management).

## **Link to Website**

[http://www.artsci.wustl.edu/~ucollege/graduate\\_healthca.html](http://www.artsci.wustl.edu/~ucollege/graduate_healthca.html)

## **Faculty**

### **Director**

Edwin B. Fisher, Ph.D.

State University of New York, Stony Brook, 1972. (Professor of Psychology, Medicine, and Pediatrics and Director, Division of Health Behavior Research.)

### **Associate Director**

Kelly M. Everard, Ph.D.

University of Kentucky, 1995. (Research Associate, Division of Health Behavior Research, Department of Medicine)

### **Instructors**

Teresa Deshields, Ph.D.

University of Georgia, 1985. (Assistant Professor, Division of Health Behavior Research, Department of Medicine, Director of Psychosocial Services, Siteman Cancer Center)

Patricia Fazzino, DNSc

Rush University, 1991 (Deputy Director, National Program Office, The Robert Wood Johnson Foundation Diabetes Initiative)

Patricia E. Freed, R.N., M.S.N., Ed.D.

Southern Illinois University-Edwardsville, 1995. (Associate Professor, Jewish Hospital College of Nursing and Allied Health)

Joan Heins, M.A.

Washington University, 1990. (Research Patient Coordinator, Division of Health Behavior Research, Department of Medicine)

Cheryl A. Houston, Ph.D.

St. Louis University, 2000. (Director of Dietetics, Program in Dietetics, Department of Environmental Sciences, Fontbonne University)

Donna B. Jeffe, Ph.D.

Washington University, 1993. (Research Assistant Professor, Division of Health Behavior Research, Department of Medicine)

Arthur Lucas, M.Div.

Duke University School of Divinity, 1973. (BJC Spiritual Care Services)

Anat Reschke, Ph.D.

Washington University, 2000. (Instructor in Medicine, Division of Health Behavior Research, Department of Medicine)

Donald Rickert, Ph.D.

St. Louis University, 1984. (Professor, St. Louis College of Pharmacy)

Mario Schootman, Ph.D.

University of Iowa, 1993. (Assistant Professor of Epidemiology and Medicine, Division of Health Behavior Research, Department of Medicine)

Leigh Tenkku, M.P.H.

St. Louis University, 1998. (Research Associate, Department of Community and Family Medicine, St. Louis University School of Medicine)

Mark Walker, Ph.D.

University of Memphis, 1998. (Instructor in Medicine, Division of Health Behavior Research, Department of Medicine)

Valerie Yancey, Ph.D.

St. Louis University, 1998. (Associate Professor, Jewish Hospital College of Nursing and Allied Health)

## Occupational Therapy

The Program in Occupational Therapy prepares students for professional practice and through its research generates knowledge to address the issues facing individuals with disabilities, chronic diseases and developmental disabilities. Students are prepared as generalists but, in addition, can concentrate their studies for work in pediatrics, aging, work and industry or social participation. The curriculum focuses on the dynamic interaction of the biological and psychological, environmental and occupational factors that enable persons to fulfill roles, and lead meaningful and productive lives. Students interact with leading physicians and scientists whose practice and science is contributing to better methods of treatment of persons with disabilities. In addition, students are linked with community agencies and leaders that are providing services to individuals with disabling conditions. Undergraduate students in pre-health, psychology, biology or anthropology will find that the Program offers a means of applying their knowledge in a professional field. Applicants must hold a bachelor's degree or be a participant in an approved three-two program and have completed prerequisite courses from an accredited college or university. The OT Program is accredited by the Accreditation Council for Occupational Therapy Education of the American Occupational Therapy Association. Graduates of the Program will be eligible to sit for the national certification examination administered by the NBCOT. (Note: a felony conviction may affect a graduate's ability to sit for NBCOT certification examination or attain state licensure.)

### ***Master of Science in Occupational Therapy Degree Program***

The professional Master of Science in Occupational Therapy degree requires courses that develop the knowledge and skills necessary to practice occupational therapy. Each candidate for a Master of Science in Occupational Therapy degree must complete a minimum of 71 hours of coursework, usually accomplished in five semesters of study (two academic years and the intervening summer.) Six months of supervised clinical fieldwork (12 credits) is required to be completed within 12 months of completion of coursework.

### ***Doctor of Occupational Therapy Degree Program***

The Doctor of Occupational Therapy (O.T.D.) is a degree providing students the opportunity to focus their occupational therapy studies in one of four areas of concentration: Productive Aging, Social Participation and the Environment, Work and Industry, and Pediatrics. The O.T.D. requires seven semesters of study and three clinical placements for students entering professional practice. Post professional students enrolled in the OTD have varying program lengths based on prior degree and experience.

A full description of degrees in Occupational Therapy is available from the office of the Program in Occupational Therapy, or at the web site [www.ot.wustl.edu](http://www.ot.wustl.edu).

Tuition and fieldwork fees (MSOT, full time) per semester:	\$10,000 for six semesters
Tuition and fieldwork fees (OTD, full-time):	\$10,000 per semester first four
semesters	\$11,500 per semester last four
semesters	
Part-time tuition:	\$800.00 per credit

## Link to Website

<http://ot.wustl.edu>

## Faculty

**M. CAROLYN BAUM, PHD** Professor of Occupational Therapy, Elias Michael Director of the Program in Occupational Therapy

**C. ROBERT ALMLI, PHD** Associate Professor of Occupational Therapy

**JANET MARIE BALOTA, PHD** Associate Professor of Occupational Therapy

**CHRISTINE R BERG, PHD** Instructor in Occupational Therapy

**ELLEN F BINDER, MD** Assistant Professor of Occupational Therapy

**JOHN C BRICOUT, PHD** Assistant Professor of Occupational Therapy

**JEANENNE M DALLAS** Instructor in Occupational Therapy

**MICHAEL N DIRINGER, MD** Professor of Occupational Therapy

**ALEXANDER W DROMERICK, MD** Assistant Professor of Occupational Therapy

**DOROTHY F EDWARDS, PHD** Associate Professor of Occupational Therapy

**JACK R. ENGSBERG, PHD** Research Assistant Professor of Occupational Therapy

**BRADLEY A EVANOFF, MD** Associate Professor of Occupational Therapy

**DAVID B GRAY, PHD** Associate Professor of Occupational Therapy

**HOLLY H HOLLINGSWORTH, PHD** Research Assistant Professor of Occupational Therapy

**VICTORIA KASKUTAS** Instructor in Occupational Therapy

**KATHLEEN KNIPEMANN, DED, BS** Instructor in Occupational Therapy

**PATRICIA D LAVESSER, PHD** Instructor in Occupational Therapy

**SUSAN E MACKINNON, MD** Professor of Occupational Therapy

**LEONARD N MATHESON, PHD, MA** Associate Professor of Occupational Therapy

**MARIAN A MINOR, PHD** Research Associate Professor of Occupational Therapy

**KERRI A MORGAN** Instructor in Occupational Therapy

**JOHN GAIL NEELY, MD** Professor of Occupational Therapy

**PEGGY A NEUFELD, PHD, MA** Instructor in Occupational Therapy

**CHRISTINE B NOVAK, BS** Research Associate Professor of Occupational Therapy

**MONICA S PERLMUTTER** Instructor in Occupational Therapy

**JAY FRANCIS PICCIRILLO, MD** Associate Professor of Occupational Therapy

**MARY SEATON** Instructor in Occupational Therapy

**SUSAN L STARK, PHD** Instructor in Occupational Therapy

**GARTH D TUBBS** Assistant Professor Emeritus of Occupational Therapy

**ELLEN TWINING TYSON** Assistant Professor Emerita of Occupational Therapy

**ELIZABETH HULL WITHERS** Assistant Professor Emerita of Occupational Therapy

## Physical Therapy

Physical Therapy is the science of human movement applied to rehabilitation, injury, fitness, injury prevention and overall health. Practicing in a variety of settings, physical therapists diagnose and treat movement dysfunction in patients with skill, competence and compassion. The Program in Physical Therapy is committed to providing students with excellent scientific and clinical education, in an environment that strives to continually lead the industry in practice, research, innovation and advocacy of movement health.

The Program in Physical Therapy at the School of Medicine offers three formal curricula that collectively foster opportunities for lifelong learning and comprehensive career development.

### The Professional Doctor of Physical Therapy

The professional curriculum is an intensive three-year experience leading to the degree Doctor of Physical Therapy. The principle focus of this professional training is to develop scientific and clinical expertise in the diagnosis and treatment of movement-related conditions. By integrating biomedical and physical sciences and clinical education with behavioral and social sciences, this curriculum provides students with the scientific expertise, critical thinking skills and interpersonal communication necessary for effective clinical practice, comprehensive treatment design, patient advocacy, patient education and health promotion. Applicants for admission must have completed 1) a bachelor's degree at an accredited institution, and 2) prerequisite courses in biology, chemistry, physics, mathematics, anatomy, physiology, English, psychology, social sciences, and humanities, and 3) the Graduate Record Examination.

## **The Postprofessional Doctor of Physical Therapy**

The post-professional clinical doctorate curriculum offers practicing physical therapists an opportunity enhance their roles as diagnosticians, evidence-based practitioners and educators for an advanced model of practice. Designed to refine the practicing physical therapist's scientific and clinical expertise, the post-professional program also leads to a Doctor of Physical Therapy. Applicants for admission must have 1) graduated from an accredited professional physical therapy program, 2) acquired acceptable grade point averages in previous academic endeavors, 3) achieved acceptable scores on the Graduate Record Examination, and 4) must be licensed to practice in the United States.

## **Doctor of Philosophy in Movement Science**

The focus of the interdisciplinary doctoral program in Movement Science is to prepare future researchers and faculty members who can enhance the profession of physical therapy. Admission to this curriculum requires acceptable scores on the Graduate Record Examination, excellence in previous academic work and demonstrated beginning abilities in posing questions of importance to the study of movement.

The faculty members of the Program in Physical Therapy are committed to being leaders in discovering and transmitting new knowledge related to movement dysfunction, preparing clinicians to assume multiple roles in a complex health care environment and fulfilling the service mission to society through active participation in humanistic, scientifically-based patient care. Students in all curricula are expected to participate actively in an environment that values integrity, initiative, creativity and the strong belief that physical therapy intervention promotes health. In these ways, all individuals associated with the Program in Physical Therapy may achieve their highest professional and personal potential.

Tuition:

Professional curriculum \$12,823 per semester

Post-professional curriculum: \$452 per credit

Doctoral curriculum: \$14,150 per semester

Further information may be obtained by direct correspondence with the Program in Physical Therapy, Campus Box 8502, 4444 Forest Park Blvd., St. Louis, MO 63108-2212.

Phone: (314) 286-1400

Fax: (314) 286-1410

e-mail: [ptprog@wustl.edu](mailto:ptprog@wustl.edu)

Web site: [pt.wustl.edu](http://pt.wustl.edu)

## **Link to Website**

<http://pt.wustl.edu>

## **Faculty**

**SUSAN DEUSINGER, PHD** Director of the Program in Physical Therapy, Professor of Physical Therapy

**AMY J BASTIAN, PHD** Adjunct Assistant Professor of Physical Therapy

**NANCY J BLOOM, DPT, BS** Instructor in Physical Therapy

**MARYBETH BROWN, PHD** Adjunct Associate Professor of Physical Therapy

**TAMARA LAVON BURLIS, DPT, BS** Instructor in Physical Therapy

**CHERYL ANN CALDWELL, DPT** Instructor in Physical Therapy

**BILLIE RUTH CLARK, PHD** Instructor in Physical Therapy

**SUZANNE MARIE CORNBLEET** Associate Director for Clinical Education in Physical Therapy, Instructor in Physical Therapy

**BETH ELAINE CROWNER** Instructor in Physical Therapy

**DIANE L. DAMIANO, PHD** Research Associate Professor of Physical Therapy

**ROBERT H DEUSINGER, PHD** Assistant Professor of Physical Therapy

**KRIKOR T DIKRANIAN, MD, PHD** Instructor in Physical Therapy

**ALEXANDER W DROMERICK, MD** Associate Professor of Physical Therapy

**GAMMON MARIE EARHART, PHD** Instructor in Physical Therapy

**JULAINÉ MARIE FLORENCE** Research Associate Professor of Physical Therapy

**MARY KENT HASTINGS, DPT** Instructor in Physical Therapy

**MARCIE HARRIS HAYES, DPT** Instructor in Physical Therapy

**STEPHEN M HIGHSTEIN, MD, PHD** Professor of Physical Therapy

**GREGORY WILLIAM HOLTZMAN** Instructor in Physical Therapy

**RENEE A IVENS** Instructor in Physical Therapy

**JOSEPH W. KLAESNER, PHD, BS** Research Assistant Professor of Physical Therapy

**CATHERINE ECKEL LANG, PHD** Instructor in Physical Therapy

**MATTHEW J MATAVA, MD** Assistant Professor of Physical Therapy

**DEBRA MCDONNELL, AS** Instructor in Physical Therapy

**MARY KATE MCDONNELL, DPT** Instructor in Physical Therapy

**SCOTT D MINOR, PHD** Assistant Professor of Physical Therapy

**DANIEL MORAN, PHD** Assistant Professor of Physical Therapy

**JOHN CARL MORRIS, MD** Professor of Physical Therapy

**MICHAEL JEFFREY MUELLER, PHD** Associate Professor of Physical Therapy

**BARBARA JEAN NORTON, PHD** Associate Director for Post Professional Education in Physical Therapy

**BARBARA JEAN NORTON, PHD** Associate Professor of Physical Therapy

**CHRISTINE B NOVAK, BS** Research Associate Professor of Physical Therapy

**JOEL S PERLMUTTER, MD** Professor of Physical Therapy

**SUSAN RACETTE, PHD** Assistant Professor of Physical Therapy

**SHIRLEY ANN SAHRMANN, PHD** Associate Director for Doctoral Studies in Physical Therapy, Professor of Physical Therapy

**DAVID R SINACORE, PHD** Associate Professor of Physical Therapy

**THERESA M SPITZNAGLE** Instructor in Physical Therapy

**PAUL S. STEIN, PHD** Professor of Physical Therapy

**MICHAEL J. STRUBE, PHD** Professor of Physical Therapy

**W. THOMAS THACH, MD** Professor of Physical Therapy

**KURT A THOROUGHMAN, PHD** Assistant Professor of Physical Therapy

**LINDA R VAN DILLEN, PHD** Assistant Professor of Physical Therapy

**PAMELA M WENDL** Instructor in Physical Therapy

**DEQUAN ZOU, D SC** Research Assistant Professor of Physical Therapy

## **Masters Program in Psychiatric Epidemiology**

The MPE Program, offered by the Epidemiology and Prevention Research Group in the Department of Psychiatry at Washington University Medical School, was established in 1989 by Lee Robins, Ph.D., and is the first and only program of its kind in the world. This program offers fundamental epidemiological and research skills, with an emphasis on interdisciplinary studies within a medical school environment. The program is noted for its public health focus, as it encompasses prevention, treatment and intervention research. It also strongly emphasizes training in the responsible conduct of science.

Candidates develop practical research skills and learn basic epidemiological methods that can be applied to many disciplines. They study the history and development of the major national and international psychiatric epidemiology studies, and they become familiar with diagnostic instruments commonly used in the field. Students learn how to organize and manage population surveys, including design, data collection and data analysis. Instructors in the program are experienced research investigators, with productive research teams.

Students come from varied backgrounds such as public health, social work, engineering, nursing, mathematics, psychology and anthropology. The overall objective of the MPE Program is to prepare pre-doctoral students and post-doctoral fellows for a productive research career in epidemiology, with an emphasis on behavioral risk factors. Graduate students in other University programs are also encouraged to enroll in courses. Undergraduate students are welcome, with the instructor's approval.

## **DEGREE IN PSYCHIATRIC EPIDEMIOLOGY**

A Master in Psychiatric Epidemiology degree is offered to candidates enrolled in the program. The degree may be earned after successful completion of 30 credits made up of 14 core courses (26 credit hours) that are required in the MPE Program and 4 credits of elective courses. Elective credits may include additional hours of Independent Study (beyond the required 6 hours). Required courses are: M08 500 Introduction to General Epidemiology, M08 502 Instruments of Psychiatric Diagnoses and Assessment, M08 505A (cross-listed as M21 505) Biostatistics for Research Workers, M08 507 Epidemiology Seminar I, M08 508 Landmarks in Psychiatric Epidemiology, M08 532 Psychiatry Grand Rounds I, M08 533 Psychiatry Research Seminar I (all offered in Fall), M08 507A Epidemiology Seminar II, M08 507B Epidemiology Seminar III, M08 532A Psychiatry Grand Rounds II, M08 533A Psychiatry Research Seminar II, M08 538 Research Methods, M08 676 Psychiatric Disorders of the Nervous System (all offered in Spring), and M08 506 Independent Study (offered Fall and Spring). In addition, a program-approved manuscript is required for graduation.

## **ACADEMIC CALENDAR**

In general, the MPE Program follows the calendar of the School of Medicine for beginning and ending dates of semesters; students should consult the web site given below for specific courses offered each semester.

## **REGISTRATION INFORMATION FOR NON-MPE STUDENTS**

All courses are open to any student, with the instructor's approval.

## **REGISTRATION INFORMATION FOR MPE STUDENTS**

Registration is done through the Program Director's office.

## **FURTHER INFORMATION**

For further information, view our web site at [www.epi.wustl.edu](http://www.epi.wustl.edu) (click on MPE) or contact Peg Greco, Administrative Coordinator (314) 286-2261 or [greco@epi.wustl.edu](mailto:greco@epi.wustl.edu).

## **LOCATION**

The MPE Program Administration is located at 40 N. Kingshighway, Parc Frontenac Building, Suite 4. Courses are held in this building and in various locations of the medical school.

## **DIRECTOR**

The director of the MPE Program is Linda B. Cottler, Ph.D., Professor of Epidemiology in Psychiatry.

## **Link to Website**

<http://epi.wustl.edu/MPE/MPEhome.htm>

## **Courses**

### **M08 500 INTRODUCTION TO GENERAL EPIDEMIOLOGY**

Instructor: Linda B. Cottler, Ph.D., 286-2252

Epidemiology is the study of health and disease in the population. This course, while introducing epidemiologic methods and classic medical studies, emphasizes the clinical importance of psychiatric epidemiology. Credit: 3 units.

### **M08 502 INSTRUMENTS OF PSYCHIATRIC DIAGNOSES AND ASSESSMENT**

Instructor: Kathleen K. Bucholz, Ph.D., 286-2284

Introduction to commonly used interviews, both structured and semi-structured, and questionnaire development since 1940 for the diagnosis of specific psychiatric disorders in children and adults.

Credit:

1 unit.

#### M08 505A BIOSTATISTICS FOR RESEARCH WORKERS

Instructor: Michael A. Province, Ph.D., 362-3616

Designed for those researchers who want to expand their knowledge of practical methods in statistics. Oriented toward statistical and epidemiological concepts, applications, practical hints, and a hands-on approach to data. Heavy use of SAS/PC for in-class examples and homework problems. Credit: 3 units. Cross-listed as M21 505 (GEMS).

#### M08 506 INDEPENDENT STUDY

Instructor: Arranged mentor

Student arranges with a faculty member to:

- 1) participate in that person's ongoing research;
- 2) research literature on a specific topic; 3) carry out secondary data analysis with an existing data set;
- 4) design and/or carry out an original research project; and/or 5) prepare a grant proposal. The faculty member meets regularly with the student and guides the project. Credit: 1-3 units.

#### M08 507 EPIDEMIOLOGY SEMINAR I: Recent Trends in Epidemiology (Credit: 1 unit)

Instructor: Linda B. Cottler, Ph.D., 286-2252

#### M08 507A EPIDEMIOLOGY SEMINAR II: Recent Progress in Epidemiology (Credit: 1 unit)

Instructor: Renee Cunningham-Williams, Ph.D., 286-2252

#### M08 507B EPIDEMIOLOGY SEMINAR III: Post Doc Presentations (Credit: 1 unit)

Instructor: Anne Glowinski, M.D., 286-2217

This series offers introduction tutorials for newly developed analytic techniques or techniques developed in other fields for advanced applications to epidemiologic studies.

#### M08 508 LANDMARKS IN PSYCHIATRIC EPIDEMIOLOGY

Instructor: Kathleen K. Bucholz, Ph.D., 286-2284

A review of the major studies in psychiatric epidemiology, describing methods and results, from the 1920s to the present. Credit: 1 unit.

#### M08 532 PSYCHIATRY GRAND ROUNDS I (Credit: 1 unit)

#### M08 532A PSYCHIATRY GRAND ROUNDS II (Credit: 1 unit)

Instructor: Carol S. North, M.D., 747-2013

Clinical psychiatric issues are discussed and illustrated with presentations of patients. Students discuss the presentation after each lecture, focusing on content and style.

#### M08 533 PSYCHIATRY RESEARCH SEMINAR I (Credit: 1 unit)

#### M08 533A PSYCHIATRY RESEARCH SEMINAR II (Credit: 1 unit)

Instructor: Anne Glowinski, M.D., 286-2217

Research studies in psychiatry covering a broad range of topics. Students meet to discuss the seminar after each lecture.

#### M08 538 RESEARCH METHODS

Instructor: Linda B. Cottler, Ph.D., 286-2252

A hands-on approach to psychiatric and substance abuse research. Enrollees attend confidential project meetings, being exposed to the ins and outs of the project's daily operations. Credit: 3 units.



#### M08 676 PSYCHIATRIC DISORDERS OF THE NERVOUS SYSTEM

Instructor: Laura J. Bierut, M.D., 362-3492

Emphasizes the diagnosis of major psychiatric illness. Psychiatric disease will be described in terms of epidemiology, clinical presentation, natural history, genetics, differential diagnosis and clinical management. Biological and psychological influences on these diseases will be presented. Interviewing techniques and performance of mental status exam will be demonstrated by patient interviews.

Credit: 1 unit.

#### M08 540 MINI COURSE--EPIDEMIOLOGY METHODS

Instructor: Kathleen K. Bucholz, Ph.D., 286-2284

Short course in epidemiologic methods. Credit: 1 unit.

#### M08 523 MINI COURSE--PSYCHOLOGICAL TESTING

Instructor: Richard D. Wetzel, Ph.D., 362-2440

Seminar format, topics vary. Credit: 1 unit.

#### M08 531 MINI COURSE--PERSONALITY DISORDERS

Instructor: C. Robert Cloninger, Ph.D., 362-7005

Seminar format, topics vary. Credit 1 unit.

#### M08 541 MINI COURSE--SCHIZOPHRENIA

Instructor: Nuri B. Farber, M.D., 362-2459

Seminar format. Credit: 1 unit.

#### M08 542 MINI COURSE--BIPOLAR DISORDER

Instructor: Nuri B. Farber, M.D., 362-2459

Seminar format. Credit: 1 unit.

#### M08 537 INTRODUCTION TO CHILD PSYCHIATRY I (Credit: 1 unit)

#### M08 537A INTRODUCTION TO CHILD PSYCHIATRY II (Credit: 1 unit)

Instructor: Joan Luby, M.D., 286-2730

These courses address normative development and developmental psychopathology as it relates to mental disorders occurring in children and adolescents.

## **Faculty**

### **Director and Professor**

Linda B. Cottler, Ph.D.,

Washington University, 1987. (Epidemiology) (See Department of Psychiatry and Health Administration Program.)

### **Associate Director and Research Assistant Professor**

Renee M. Cunningham-Williams, Ph.D., M.P.E.,

Washington University, 1994. (Social Work) (See Department of Psychiatry.)

### **Professors**

C. Robert Cloninger, M.D.,

Washington University, 1970. (See Department of Psychiatry and Department of Genetics.)

Carol S. North, M.D.,

Washington University, 1983; M.P.E., 1993. (See Department of Psychiatry.)

Michael A. Province, Ph.D.,

Washington University, 1987. (See Clinical Investigation Program.)

Edward L. Spitznagel Jr., Ph.D.,  
The University of Chicago, 1965. (See Division of Biostatistics.) (Also Department of Mathematics)

Richard D. Wetzel, Ph.D.,  
St. Louis University, 1974. (See Department of Neurological Surgery and Department of Neurology.)

### **Research Professor**

Kathleen K. Bucholz, Ph.D.,  
Yale University, 1986. (See Department of Psychiatry.)

### **Associate Professor**

Laura J. Bierut, M.D.,  
Washington University, 1987.

### **Assistant Professors**

Nuri B. Farber, M.D.,  
Washington University, 1989.

Joan Luby, M.D.,  
Wayne State University, 1985. (See Department of Psychiatry.)

## **Program in Audiology and Communication Sciences**

### ***PROGRAM IN AUDIOLOGY AND COMMUNICATION SCIENCES***

The Program in Audiology and Communication Sciences provides advanced training and graduate programs in the fields of clinical audiology, deaf education, and speech and hearing sciences. Established at Central Institute for the Deaf (CID) in 1914, the training programs are now a member of a consortium of programs that also includes clinical services and research programs, known as "CID at Washington University School of Medicine." The Program also maintains its close affiliation with CID's school for hearing-impaired children.

### **Link to Website**

<http://www.cid.wustl.edu/gradstud/Audiology/Audiology.htm>

### **Courses**

#### ***Master of Science—Deaf Education***

The graduate program in deaf education is a two-year program that prepares students to become classroom teachers of hearing-impaired children. The program promotes the oral philosophy—that deaf and hearing-impaired children can learn to listen and talk—and prepares teachers to help children develop their spoken and written language skills. For very young children, language and speech concepts are conveyed in a variety of settings and generally involve working closely with parents, families, and other caregivers. For older children, language and speech are taught in a classroom setting in concert with conventional academic subjects normally taught in kindergarten through the elementary grades.

Students proceed from broadly based classroom instruction and observation to progressively more specialized coursework and practice teaching experiences. The first-year coursework provides the foundation for practice. Students gain knowledge in the basic and applied sciences, curriculum, and instructional methods. The second-year coursework provides advanced training in evaluation techniques, manual communication, intervention strategies, counseling techniques, research methods and practice teaching experiences. The CID school for hearing-impaired children serves as the primary site for student teaching for students in the deaf education program. A one-year program for experienced teachers of the deaf is also available.

The deaf education programs are accredited by the State of Missouri's Department of Elementary and

Secondary Education and the Council on Education of the Deaf (CED). Graduates of the program are eligible for teacher certification in the State of Missouri (deaf/hearing impaired, K-12) and for national certification by CED.

### ***Doctor of Audiology (Au.D.)***

The four-year graduate program in audiology trains students to become independent clinicians and leads to the Doctor of Audiology (Au.D.) degree. The program is designed to provide students with the knowledge and skills that reflect the latest advances in evaluation and treatment of hearing conditions. Students gradually progress from classroom-based instruction to clinical practice in audiology. The first three years provide students with the foundation for practice, with students gaining knowledge and skills in the basic and applied sciences, evaluation and diagnosis practices for adults and children, hearing disorders, professional issues and ethics, research methods, and clinical observation and practice. The fourth year is spent in a full-time clinical externship.

The audiology program is accredited by the American Speech-Language-Hearing Association (ASHA). Graduates are eligible for national certification by ASHA.

### ***Master of Arts (M.A.) in Speech and Hearing Sciences***

### ***Doctor of Philosophy (Ph.D.) in Speech and Hearing Sciences***

The focus of the interdisciplinary programs in Speech and Hearing Sciences (M.A. and Ph.D.) is to prepare future researchers and academicians in the fields of audiology, deaf education, speech and language, or sensory neurosciences. Students generally work one-on-one with faculty researchers during their studies. Training builds upon the student's basic knowledge of aspects of the fields that pertain to speech, language, and hearing and emphasizes research experience.

The Speech and Hearing Sciences programs are operated by the Program in Audiology and Communication Sciences, and administered through the Department of Speech and Hearing in the Graduate School of Arts & Sciences.

### ***Calendar:***

In general, the Program follows the academic calendar of the School of Arts & Sciences. Students should consult to the Program calendar for specific information.

### ***Contact Information:***

Further information may be obtained by contacting:

Washington University School of Medicine  
Program in Audiology and Communication Sciences  
660 S. Euclid Avenue, Campus Box 8042  
St. Louis, MO 63110

Phone: (314) 977-0240  
Fax: (314) 977-0027  
E-mail: [elliottb@msnotes.wustl.edu](mailto:elliottb@msnotes.wustl.edu)  
Web: [www.cid.wustl.edu/gradstud](http://www.cid.wustl.edu/gradstud)

### ***Faculty***

#### ***Program Director***

William W. Clark, Ph.D.,  
University of Michigan, 1975.

#### ***Professors***

Barbara A. Bohne, Ph.D.,  
Washington University, 1971.

Donald G. Brennan, Ph.D., CCC-SLP,  
University of Oklahoma, 1974.

Ann E. Geers, Ph.D.,  
Washington University, 1979.

James D. Miller, Ph.D.,  
Indiana University, 1957.

T.K. Parthasarathy, Ph.D., CCC-A,  
University of Texas-Dallas, 1987.

Margaret W. Skinner, Ph.D., CCC-A,  
Washington University, 1976.

Brad A. Stach, Ph.D., CCC-A,  
Baylor College of Medicine, 1986.

Nancy Tye Murray, Ph.D.,  
University of Iowa, 1984.

Michael Valente, Ph.D., CCC-A,  
University of Illinois, 1975.

Associate Professors  
J. David Dickman, Ph.D.,  
University of Wyoming, 1985.

Judith M. Ogilvie, Ph.D.,  
Harvard University, 1983.

Kevin K. Ohlemiller, Ph.D.,  
Northwestern University, 1990.

Dwayne D. Simmons, Ph.D.,  
Harvard University, 1986.

Mark E. Warchol, Ph.D.,  
Northwestern University, 1989.

### **Assistant Professors**

Carl D. Bohl, D.Sc.,  
University of Cincinnati, 1973.

Lisa S. Davidson, Ph.D., CCC-A,  
Washington University, 2003.

Brian T. Faddis, Ph.D.,  
University of California-Davis, 1994.

Roanne K. Karzon, Ph.D., CCC-A,  
Washington University, 1982.

David I. Mason, Ph.D., CCC-A,  
University of Tennessee, 1983.

Johanna G. Nicholas, Ph.D.,  
Washington University, 1990.

Rosalie M. Uchanski, Ph.D.,  
MIT, 1988

### **Lecturers**

Brigid B. Barringhaus, M.S.,  
Washington University, 1999.

Lynda C. Berkowitz, M.S.,  
Washington University 1983.

Deborah L. Carter, M.A.T.,  
Webster University, 1991.

Christine M. Clark, M.A.,  
Maryville University, 1999.

J. Eric Driskill, M.Ed.,  
University of Arkansas, 1994.

JoEllen Epstein, M.A.Ed.,  
Maryville University, 2000.

Barbara A. Lanfer, M.A.Ed.,  
University of Missouri-St. Louis, 1998.

E. Tracy Mishler, M.A., CCC-A,  
Northwestern University, 1981.

Kathleen Rehwinkel, M.S., CCC-A/SLP,  
Washington University, 2000.

Mary H. Russo, M.S., CCC-A,  
Washington University, 1989.

Catherine Schroy, M.S., CCC-A,  
Washington University, 1998.

### **Professors Emeritus**

Donald H. Eldredge, M.D.

Ira J. Hirsh, Ph.D.,

David P. Pascoe, Ph.D., CCC-A

### **School of Medicine/St. Louis College of Pharmacy Student Research Training Program**

A key academic institution in our biomedical and clinical health center environment is the St. Louis College of Pharmacy. It is one of the premier institutions in the country for the teaching and training of pharmacists. The College's extensive pharmaceutical sciences curriculum has generated interest by a number of their students in laboratory biomedical research. Students beyond their fourth year at St. Louis College of Pharmacy who demonstrate interest in science and research, and are recommended by the College faculty, will have an opportunity to complete 10- to 14-week fellowships in any of the laboratories at the School of Medicine. Students can, with consent of their advisors at the College of Pharmacy and the laboratory principal investigator, extend their stay. This joint research collaboration should encourage those students in the program to pursue graduate degrees in the Division of Biomedical Sciences at the School of Medicine.

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### **Administration**

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### **Officers and Committees of the Faculty**

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- 3 Preclinical Full-Time Representative 2001-2003

## **Faculty Council**

The Faculty Council consists of all full-time members of the faculty with the rank of professor, associate professor, assistant professor, and those instructors who have been on the faculty for at least three years. The officers and executive committee are:

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LaTish McKinney

Judi McLean Parks

Dana C. McWay

Kathleen Mead

Catina C. Meeks

Mel G. Meyer

Bryan F. Meyers

Sheila M. Michalski

Scott D. Minor

Kerri A. Morgan

Ronald Munson

Matthew G. Mutch

Leonard L. Naeger

J. Gail Neely

Elliot C. Nelson

Kyle Nelson

Heather Nix

JoAnne Norton

William L. Nowatzke

Meg O'Neill

Janice L. Palmer

Dawn D. Pesti

Byron Peters

Elizabeth M. Peters

Erwin (Pete) H. Peters

Stephanie M. Porto

William G. Powderly

Matthew A. Powell

Rumi K. Price  
Marc Pudlowski  
Teresa L. Radake  
Robert B. Ramsey  
Jebadurai Ratnaraj  
Jackie A. Raybuck-Saleeby  
Carleen J. Reck  
Leonard Rivas  
Janet Riley  
Heather M. Robertson  
Leslie Rodman-Popelka  
Walter H. Rothman  
Sharon H. Rothmel  
Carol L. Rush  
Linda H. Sandmel  
Patricia M. Scannell  
Lynn Schallom  
Fran Schapiro  
Mary Ellen Scheipeter  
Marnie Schneider  
Charles R. Schrock  
Kevyn F. Schroeder  
Robert G. Schwendinger  
Brian Seiz  
William D. Shannon  
Richard C. Shaw  
Denise Shearrer  
Shantia D. Shears  
Alan Shiels  
Chaplain Dace Skudina  
Phyllis K. Stein  
Catherine L. Striley



Robert C. Strunk  
Patrick M. Stuart  
Melissa Swallow  
Cindy Mae Terrill  
Betsy Thomas  
Paul A. Thompson  
Denise R. Turnbow  
Bruce D. Umbaugh  
Mark L. Unland  
Leslie J. Upchurch  
Linda Van Dillen  
Elizabeth B. Vargus  
Lloyd J. Vasquez Jr.  
Kathryn L. Vehe  
Teresa J. Vietti  
Alphonso H. Voorhees  
Janet I. Voorhees  
Thomas William Walsh  
Paulette E. Walton  
Jun Wang  
Michael D. Ward  
Angela M. Warner  
Scott C. Weber  
H. James Wedner  
Marcia R. Weis  
Richard D. Wetzel  
Michael P. Whyte  
Cynthia A. Wichelman  
Laurel A. Wiersema-Bryant  
Deborah J. Williams  
Chengjie Xiong  
Yan Yan  
Kevin E. Yarasheski

Stuart D. Yoak

Roberta L. Yoffie

Nina A. Zimmerman

Gary R. Zuckerman

**Institutional Biological and Chemical Safety Committee (IBC)**

Samuel Stanley  
*Chairman*

Bruce Backus  
*ex officio*

Kenneth Boschert  
*ex officio*

Michael Caparon

Josephine Clark-Curtiss

Douglas Covey

Victoria Fraser

Jeffrey Gordon

Henry Huang

Joe Kanabrocki  
*ex officio*

Robert Koehler

David Leib

Virginia Miller

Daniel Ory

Joseph St. Geme

Gregory Storch

**M.A./M.D. Program Committee**

Daniel P. Kelly  
*Chairman*

F. Sessions Cole

Michael R. DeBaun

Jonathan M. Green

Ellen Li

Howard L. McLeod

Daniel P. Schuster

Lawrence H. Snyder

## **Medical School Faculty Rights Committee (2004-2005)**

Jeffrey Saffitz  
*Chairman*

Peter Humphrey

Kathleen C. McGann

Thomas A. Woolsey

David C. Beebe  
*Alternate*

David Cistola  
*Alternate*

Paul A. Schlesinger  
*Alternate*

## **Medical Scientist Training Program Committee**

Daniel E. Goldberg  
*Program Director*

Jeanne M. Nerbonne  
*Program Co-Director*

Kendall J. Blumer

Alison M. Goate

Ted H. Hansen

Anthony J. Muslin

David R. Piwnica-Worms

Jean E. Schaffer

Douglas M. Tollefsen

Herbert W. Virgin

Robert S. Wilkinson

Thomas A. Woolsey

Frank C.P. Yin

## **Radiation Safety Committee**

Barry A. Siegel  
*Chairman*

Joseph L. Roti Roti  
*Vice Chairman*

Susan M. Langhorst  
*Executive Secretary*

Bruce D. Backus

Keith C. Fischer

Perry W. Grigsby

Michele Hill

Eric E. Klein

Michael L. Landt

Zuofeng Li

Don A. Lichti

Stephen M. Moerlein

Henry D. Royal

Lee G. Sobotka

Michael J. Welch

Angel Medina  
*Alternate*

Walt C. Davis Jr.  
*Alternate*

Sally Wagner Schwarz  
*Alternate*

W. John Smith II  
*Alternate*

Cynthia S. White  
*Alternate*

### **Radioactive Drug Research Committee**

Barry A. Siegel  
*Chairman*

Marcus E. Raichle  
*Vice Chairman*

Keith C. Fischer

Edward M. Geltman

Susan M. Langhorst  
*ad hoc*

James L. Littlefield

Karen McElvany

Sally Wagner Schwarz

Yuan-Chuan Tai

Michael J. Welch

### **Alvin J. Siteman Cancer Center Protocol Review and Monitoring Committee**

Joel Picus  
*Co-Chair*

Barry A. Siegel  
*Co-Chair*

Jennifer Bell

Kathryn Britton

Jill Dietz

Ramaswamy Govindan

Thomas Hall

Adam Kibel

David Linehan

Lynne Lippmann

M. Katherine Mathews

Robert J. Myerson

John D. Pfeifer

Janet S. Rader

Gwen Randall

Stephen Ristvedt

Kenneth B. Schechtman

Benjamin Tan

Teresa J. Vietti

Ravi Vij

Chrisann Winslow

Jeffrey J. Brown  
*ad hoc*

Paula M. Fracasso  
*ad hoc*

Maria Grabowski  
*ad hoc*

Jo Hawkins  
*ad hoc*

Robert J. Hayashi  
*ad hoc*

David B. Mansur  
*ad hoc*

Elizabeth Gerard McFarland  
*ad hoc*

Howard L. McLeod  
*ad hoc*

Byron Peters  
*ad hoc*

Alan Weinstein  
*ad hoc*

Nancy L. Bartlett  
*ex officio*

Jeff M. Michalski  
*ex officio*

J. Philip Miller  
*ex officio*

Jeffrey F. Moley  
*ex officio*

**Alvin J. Siteman Cancer Center Quality Assurance and Safety Monitoring Committee**

Nancy L. Bartlett  
*Chair*

Richard J. Battafarano

Steven M. Devine

Dana Kelley

J. Philip Miller

Michael J. Naughton

Wade L. Thorstad

## Register of Students

### Register of Students

#### Alphabetical List of Students

**Note:** This may not be a complete listing. Some students may have elected to withhold directory information.

**Kirsten Lee Abel** Program: Doctor of Medicine, Clinical Clerkship Year

**Sarah Renee Adams** Pittsburgh, PA, BS, Oakwood College '03, Program: Doctor of Medicine, Second Year Medical Student

**Elaine Jean Ahillen** Program: Doctor of Medicine, First Year Medical Student

**Jacqueline Marie Ahillen** Program: Doctor of Medicine, First Year Medical Student

**Omar Rizwan Ahmad** Carbondale, IL, BS, The University of Chicago '01, Program: Doctor of Medicine, Elective Year

**Saba Ahmad** Burr Ridge, IL, BS, Northwestern University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Christina Kim Ahn** Program: Doctor of Medicine, First Year Medical Student

**Shreeram Akilesh** Bangor, ME, BA, Dartmouth College '00, Program: MSTP, First Year Research

**Jesse Aaron Alba** Marietta, GA, BS, Brigham Young University '03, Program: Doctor of Medicine, Second Year Medical Student

**Jennifer Marie Alexander** Columbus, NE, BS, University of Nebraska, Lincoln '99, Program: MSTP, Third Year Research

**Kevin Dennis Alford** O'Fallon, IL, BA, The Johns Hopkins University '03, Program: Doctor of Medicine, Second Year Medical Student

**Brian Frazer Scot Allen** Knoxville, TN, BA, Washington University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Benedict Joseph Alter** Dayton, OH, BS, Washington University '03, Program: MSTP, Second Year Medical Student

**Courtney Joseph Amor** Glendora, CA, BS, University of California, Los Angeles '03, Program: Doctor of Medicine, Second Year Medical Student

**Mallika Anand** Warren, CA, BA, Texas A & M University '01, Program: Doctor of Medicine, Second Year Medical Student

**Shuchi Anand** Shoreview, MN, BA, Carleton College '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Anthony John Apicelli** Titusville, NJ, BA, Princeton University '99, Program: MSTP, Third Year Research

**Alejandro Aquino** Aurora, IL, BS, University of Notre Dame '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Kevin Lee Ard** Maize, KS, BA, Washington University '02, Program: Doctor of Medicine, Second Year Medical Student

**Juliet Tenilola Aregbesola** Orlando, FL, BS, Xavier University of Louisiana '03, Program: MSTP, Second Year Medical Student

**Leonard Hart Armstrong** Minot, ND, BS, Montana State University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Theodore Nader Armstrong** Program: Doctor of Medicine, First Year Medical Student

**Caroline Lyle Arthur** Program: Doctor of Medicine, First Year Medical Student

**Molly Katharine Arvin** Program: Doctor of Medicine, First Year Medical Student

**Jonathan Craig Baker** Cincinnati, OH, BA, St. Louis University '00, Program: Doctor of Medicine, 2004 Graduate, Transitional Year, Forest Park Hospital, St. Louis, MO, Diagnostic Radiology, Barnes-Jewish Hospital, St. Louis, MO

**Justin Taylor Baker** Decatur, GA, BS, Brown University '97, Program: MSTP, Fourth Year Research

**Sami Jihad Barmada** Pittsburgh, PA, BS, University of Pittsburgh '98, Program: MSTP, Fifth Year Research

**Kara Michelle Barnett** Livingston, NJ, BA, Washington University '01, Program: Doctor of Medicine, Elective Year

**Jason Michael Baron** Program: Doctor of Medicine, First Year Medical Student

**Laurel Beth Barrett** Keokuk, IA, BS, Brigham Young University '03, Program: Doctor of Medicine, Second Year Medical Student

**Thomas Benedict Bartnikas** Ithaca, NY, Program: MSTP, 2004 Graduate, Pediatrics, Children's Hospital, Boston, MA

**Lisa Bauman** Program: Doctor of Medicine, First Year Medical Student

**Aimee Marguerite Baumann** Minden, NV, BA, Cornell University '00, Program: Doctor of Medicine, Elective Year

**Rebecca Ann Bavolet** Little Rock, AR, BS, University of Illinois, Urbana-Champaign '98, Program: Doctor of Medicine, Second

Year Medical Student

**Lauren Ashley Baylor** Brecksville, OH, BS, Ohio State University '01, Program: MSTP, Second Year Research

**Roger V Belizaire** Midland, TX, MS, University of Texas Health Science Center '03, BA, Princeton University '00, Program: MSTP, Second Year Medical Student

**Peter Scott Benjamin** Somers, CT, BS, Brown University '00, Program: Doctor of Medicine, Elective Year

**Andrea Lynn Bennett** Wayne, NJ, BS, Boston College '00, Program: Doctor of Medicine, Elective Year

**Anne Elizabeth Berenbom** Kansas City, MO, BA, University of Pennsylvania '01, Program: Doctor of Medicine, Elective Year

**Patrick Finley Bergin** Natchez, MS, BS, Mississippi State University '01, Program: Doctor of Medicine, Elective Year

**Daniel William Bergner** Plainfield, IL, BS, University of Illinois, Urbana -Champaign '01, Program: Doctor of Medicine, Elective Year

**Paul Anthony Berry** Tampa, FL, BS, University of South Florida '98, Program: Doctor of Medicine (5 Year), 2004 Graduate, Plastic Surgery, Texas A & M - Scott & White, Temple, TX

**Cagri Giray Besirli** Bursa, Turkey, BS, University of Michigan, Ann Arbor '98, Program: MSTP, Fifth Year Research

**Neil Bikrant Bhamb** Program: Doctor of Medicine, First Year Medical Student

**Ajay Kamal Bhatia** Timonium, MD, BA, The Johns Hopkins University '97, BS, Oxford University '99, Program: MSTP, Fourth Year Research

**Kathryn J Bitter** Program: Doctor of Medicine, First Year Medical Student

**Guy Matthew Bizek** Aurora, MO, BA, St Louis University '01, Program: Doctor of Medicine, Clinical Clerkship Year

**Seth Michael Bloom** Program: MSTP, First Year Medical Student

**Jennifer Michelle Boland** Seneca, WI, BS, University of Wisconsin '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Cale Walter Bonds** Englewood, CO, BS, U.S. Air Force Academy '00, Program: Doctor of Medicine, 2004 Graduate, Orthopaedic Surgery, University of California, Davis Medical Center, Sacramento, CA

**Michael Rashad Booker** Aurora, CO, BS, Colorado School Of Mines '98, Program: Doctor of Medicine, Clinical Clerkship Year

**Michael Magdy Bottros** Chesterfield, MO, BA, Washington University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Andrew Wynn Bowman** Athens, GA, BS, Vanderbilt University '97, BS, Vanderbilt University '97, Program: MSTP, Sixth Year Research

**Ryan James Bowman** Bakersfield, CA, BA, University of California '00, Program: Doctor of Medicine, Clinical Clerkship Year

**Brian Adam Boyd** Caruthersville, MO, BS, University of Missouri, Columbia '02, Program: Doctor of Medicine, Second Year Medical Student

**Kevin David Brandstetter** Town & Country, MO, BS, Northwestern University '99, Program: Doctor of Medicine, 2004 Graduate, Emergency Medicine, Resurrection Medical Center, Chicago, IL

**Jason A Brant** Program: Doctor of Medicine, First Year Medical Student

**Judson Alyn Brewer** Princeton, NJ, BA, Princeton University '96, Program: MSTP, 2004 Graduate, Psychiatry, Yale-New Haven Hospital, New Haven, CT

**Paul Andrew Brewer** Newburg, OR, BS, George Fox University '00, Program: Doctor of Medicine, Clinical Clerkship Year

**Michael Joseph Brigg** Leavenworth, KS, BA, Dartmouth College '00, Program: Doctor of Medicine, 2004 Graduate, Diagnostic Radiology, University of New Mexico, Albuquerque, NM

**Erica Lynne Brooks** Plymouth, MN, BA, Harvard University '99, Program: Doctor of Medicine, 2004 Graduate, Internal Medicine, University of Chicago Hospital, Chicago, IL

**Justin Ryan Brooks** Program: MSTP, First Year Medical Student

**Alyssa Camille Browning** Cape Girardeau, MO, BS, Rhodes College '97, Program: Doctor of Medicine, 2004 Graduate, Internal Medicine, Vanderbilt University Medical Center, Nashville, TN

**Kristin Rebecca Brown** Program: Doctor of Medicine, First Year Medical Student

**Allen Thomas Bruce** North Attleboro, MA, BA, Johns Hopkins University '95, Program: MSTP, 2004 Graduate, Dermatology, University of Michigan Hospitals, Ann Arbor, MI

**Staci Bryson** Salt Lake City, UT, BS, Brigham Young University '02, Program: Doctor of Medicine, Second Year Medical Student

**Oname Oro Burlingame** St. Louis, FL, BA, Claremont McKenna College '96, Program: MSTP, Seventh Year Research

**Justin Michael Burton** Annapolis, MD, BS, University of Maryland, College Park '01, Program: Doctor of Medicine, Elective Year

**Patrick John Bushard** Random Lake, WI, BA, Northwestern University '01, MS, Northwestern University '01, Program: Doctor of Medicine, Elective Year

**Andrew Shine Butler** Canton, MA, BS, University of North Carolina, Chapel Hill '00, Program: Doctor of Medicine, 2004



Graduate, Emergency Medicine, University Hospital, Cincinnati, OH

**Tracie Lynette Butler** Kingwood, TX, BA, Baylor University '99, Program: Doctor of Medicine, 2004 Graduate, Pediatrics, Cincinnati Children's Hospital, Cincinnati, OH

**Craig Alan Byersdorfer** Duluth, MN, BS, University of Minnesota, Duluth '95, BA, University of Minnesota, Duluth '95, Program: MSTP, Sixth Year Research

**Gregory Dee Byrd** Hillsboro, OR, BS, University of Oregon '00, Program: Master of Arts/ Doctor of Medicine, Elective Year

**Sheng Feng Cai** Cincinnati, OH, BS, Duke University '02, Program: MSTP, First Year Research

**Anthony Jay Callisto** Reno, NV, BS, University of Southern California '00, Program: Doctor of Medicine, 2004 Graduate, Emergency Medicine, Indiana University School of Medicine, Indianapolis, IN

**John Allan Campbell** Peoria, IL, BS, University of Illinois, Urbana -Champaign '98, Program: Doctor of Medicine, Elective Year

**Kenisha Natalie Campbell** Kingston, Jamaica, BA, Cornell University '00, Program: Doctor of Medicine, Elective Year

**John Chamberlain Carlisle** Lees Summit, MO, BS, Duke University '99, Program: Doctor of Medicine, 2004 Graduate, Orthopaedic Surgery, Barnes-Jewish Hospital, St. Louis, MO

**Kathryn Lynne Carlson** State College, PA, BS, Cornell University '99, Program: Doctor of Medicine, 2004 Graduate, Pediatrics, Children's Memorial Hospital, Chicago, IL

**Tracy Michelle Carlson** Albuquerque, NM, BA, University of Tulsa '03, Program: MSTP, Second Year Medical Student

**Karen Ama-Serwa Chachu** New York City, NY, BA, Williams College '01, Program: MSTP, Second Year Research

**Rebecca J Chancey** Program: Doctor of Medicine, First Year Medical Student

**Elaine Soling Chan** Vancouver, British Columbia, BA, The University of Chicago '01, Program: Doctor of Medicine, Second Year Medical Student

**Carolyn Jean-An Chang** Port Washington, NY, BS, Stanford University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Jinny E Chang** Program: Doctor of Medicine, Clinical Clerkship Year

**Sherwin Shiu-Cheung Chan** Vancouver, British Columbia, Canada, BS, Queen's University at Kingston '00, BS, Queen's University at Kingston '00, Program: MSTP, Third Year Research

**Walter Wai-Yip Chan** San Francisco, CA, BS, Washington University '00, BS, Washington University '00, Program: Doctor of Medicine, 2004 Graduate, Internal Medicine, Barnes-Jewish Hospital, St. Louis, MO

**David Yuan-Sou Chen** Troy, MI, BS, University of Michigan, Ann Arbor '03, Program: MSTP, Second Year Medical Student

**Lea Ann Chen** Duncan, OK, BA, Rice University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Victoria Y.C. Chen** North Potomac, MD, BS, Stanford University '97, Program: Doctor of Medicine, Elective Year

**Peggy Lee Ann Chern** Palos Verdes, CA, BS, University of California, Los Angeles '97, MA, University of California, Berkeley '99, Program: Doctor of Medicine, 2004 Graduate, Dermatology, University of Iowa Hospitals and Clinics, Iowa City, IA

**Herbert Cheuhui Chiang** Memphis, TN, BA, Washington University '00, Program: MSTP, Third Year Research

**Lily Constance Chiang** Los Altos, CA, BA, Stanford University '01, Program: Doctor of Medicine, Clinical Clerkship Year

**Kimberly Chik** Bloomfield Hill, MI, BS, University of Michigan, Ann Arbor '02, Program: Doctor of Medicine, Second Year Medical Student

**Samuel Kang-Wook Cho** Abington, PA, BA, University of Virginia '99, Program: Doctor of Medicine, 2004 Graduate, Orthopaedic Surgery, New York Presbyterian Hospital-Columbia, New York, NY

**Soo-Jin Cho** Seoul, Korea, MS, Yale University '00, BS, Yale University '00, Program: MSTP, Third Year Research

**Courtney Darcey Chrisler** St. Louis, MO, BA, Northwestern University '03, Program: Doctor of Medicine, Second Year Medical Student

**Matthew John Christopher** St. Louis, MO, BA, St. Louis University '93, Program: MSTP, Second Year Research

**Kao-Ping Chua** Johnson City, TN, BS, Vanderbilt University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Celeste Ming Chu** Newport Beach, CA, BA, Pomona College '00, Program: Doctor of Medicine, 2004 Graduate, Pediatrics, St. Louis Children's Hospital, St. Louis, MO

**Jennifer Y. Chu** Plano, TX, MS, Stanford University '02, BS, Stanford University '02, Program: Doctor of Medicine, Second Year Medical Student

**Jonathan Hero Chung** Glenview, IL, BS, Union College '00, Program: Doctor of Medicine, 2004 Graduate, Transitional Year, Scripps Mercy Hospital, San Diego, CA, Diagnostic Radiology, University of Washington Affiliated Hospitals, Seattle, WA

**Stephen Shiu-Wah Chung** Mundelein, IL, BA, Cornell University Endowed Colleges '01, Program: Doctor of Medicine, Clinical Clerkship Year

**Wendy Eun Chun** Northbrook, IL, BA, Yale University '00, Program: Doctor of Medicine, 2004 Graduate, Psychiatry, Advocate Lutheran General Hospital, Park Ridge, IL

**Catherine Carol Cibulskis** Morton Grove, IL, BA, Washington University '00, Program: Doctor of Medicine, Elective Year

**Heather Marie Ciliberto** Omaha, NE, BS, University of Illinois, Urbana-Champaign '02, Program: Master of Arts/ Doctor of Medicine, Second Year Medical Student

**Michael A. Ciliberto** Carlinville, IL, MS, University of Illinois, Urbana-Champaign '01, BS, University of Illinois, Urbana-Champaign '99, Program: Doctor of Medicine (5 Year), Elective Year

**Alexander Li Cohen** Augusta, GA, BA, Washington University '03, Program: MSTP, Second Year Medical Student

**Michael Cohen** Woburn, MA, BA, Harvard University '98, Program: Master of Arts/ Doctor of Medicine, Elective Year

**John Charles Cole** Keokuk, IA, BS, Washington University '95, Program: MSTP, 2003 Graduate, Pediatrics, St. Louis Children's Hospital, St. Louis, MO

**Roger Barto Cole** Program: Doctor of Medicine, First Year Medical Student

**Justin Roy Connor** Sunrise, FL, BS, Morehouse College '01, Program: Doctor of Medicine, Elective Year

**Margaret Marie Cooley** Vestal, NY, BA, Williams College '01, Program: Doctor of Medicine, Second Year Medical Student

**Shane Eric Cotter** Silver Spring, MD, BS, University of North Carolina, Chapel Hill '97, Program: MSTP, Fifth Year Research

**Martha Laurin Council** New Iberia, LA, BS, Louisiana State University '00, Program: Doctor of Medicine, 2004 Graduate, Surgery-Preliminary, Barnes-Jewish Hospital, St. Louis, MO

**Matthew Daniel Council** Laurel, MS, BS, University of Mississippi '00, Program: Doctor of Medicine, 2004 Graduate, Transitional Year, St. John's Mercy Medical Center, St. Louis, MO, Ophthalmology, Washington University, St. Louis, MO

**Madeleine Beata Courtney-Brooks** Columbus, OH, BA, Kenyon College '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Christopher Andrew Cox** Merced, CA, BA, University of The Pacific '03, Program: Doctor of Medicine, Clinical Clerkship Year

**Nathan R Cox** Program: Doctor of Medicine, First Year Medical Student

**Timothy Scott Crall** Gurnee, IL, BA, Franklin and Marshall College '01, Program: Doctor of Medicine, Elective Year

**Lara Wiley Crock** Evanston, IL, BA, Barnard College '01, Program: MSTP, First Year Research

**Qi Cui** Beijing, China, BS, Massachusetts Institute of Technology '99, Program: Doctor of Medicine, 2004 Graduate, Internal Medicine-Preliminary, Medical College of Wisconsin, Milwaukee, WI, Anesthesiology, University of Chicago Hospital, Chicago, IL

**Tia Suzanne Curry** Sacramento, CA, BA, California State University, Sacramento '03, Program: Doctor of Medicine, Second Year Medical Student

**Nefertari Daaga** Port of Spain, Trinidad, BA, Dartmouth College '00, Program: Doctor of Medicine, 2004 Graduate, Obstetrics and Gynecology, Barnes-Jewish Hospital, St. Louis, MO

**Rishikesh Pradip Dalal** Program: Doctor of Medicine, First Year Medical Student

**Benjamin Jesse Davis** Highland Park, IL, BA, New York University '03, Program: Doctor of Medicine, Second Year Medical Student

**Alex Martin De Shields** Easton, MA, BA, Swarthmore College '98, Program: Doctor of Medicine (5 Year), Elective Year

**Joel Glenn Dean** Bromley, England, BS, Cedarville College '99, Program: Doctor of Medicine, 2004 Graduate, General Surgery, St. Barnabas Medical Center, Livingston, NJ

**Brian Jesse DeBosch** Ann Arbor, MI, BS, University of Michigan, Ann Arbor '01, Program: MSTP, Second Year Research

**Kenneth Clark Deem** Tacoma, WA, BA, Dartmouth College '98, Program: Doctor of Medicine, 2004 Graduate, General Surgery, Dartmouth-Hitchcock Medical Center, Lebanon, NH

**Shadmehr Demehri** Program: Doctor of Medicine, First Year Medical Student

**Megan Amanda Denzel** Southbury, CT, BA, Washington University '02, Program: Doctor of Medicine, Second Year Medical Student

**Pooja Bholanath Dhume** New Orleans, LA, BA, University of Rochester '01, Program: Doctor of Medicine, Elective Year

**Luigi Turrido Di Stefano** Alhambra, CA, BS, University of California, Los Angeles '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Mark Stephen Diamond** Washington, DC, BA, Princeton University '00, Program: MSTP, Third Year Research

**Michael Jason Dieckhaus** Washington, MO, BS, Vanderbilt University '02, Program: Doctor of Medicine, Second Year Medical Student

**Angela Marie Dietrich-Kusch** Fresno, CA, BA, Claremont McKenna College '01, Program: Doctor of Medicine, Second Year Medical Student

**Manuel Doblado** Program: Doctor of Medicine, First Year Medical Student

**Diana Kay Dolinsky** Greenville, SC, BS, Duke University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Maia Dorsett** Program: MSTP, First Year Medical Student

**Ian Gordon Dorward** Aurora, CO, BA, University of Colorado, Boulder '00, Program: Doctor of Medicine, Elective Year

**Nico Urs Dosenbach** Gultlingen, Germany, BA, Columbia University '00, AH, University of Arbituri '96, Program: MSTP, Third Year Research

**Anne Meredith Drewry** St Louis, MO, BS, Yale University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Julie Ann Drobish** Carrolltown, PA, BS, Pennsylvania State University '03, Program: MSTP, Second Year Medical Student

**Jessica Duan** Program: Doctor of Medicine, First Year Medical Student

**Joseph Ethan Dubin** Kansas City, MO, BS, Tulane University '01, Program: Doctor of Medicine, Elective Year

**Daniel Ervin Dulek** Northport, AL, BS, University of Notre Dame '00, Program: Doctor of Medicine, 2004 Graduate, Pediatrics, Children's Memorial Hospital, Chicago , IL

**Gavin Peter Dunn** Columbia, MO, Program: MSTP, Fifth Year Research

**Alison Patricia Durley** St. Louis, MO, BS, Yale University '00, Program: Doctor of Medicine, 2004 Graduate, Psychiatry, Dartmouth-Hitchcock Medical Center, Lebanon, NH

**Susan Marie Dusenbery** Seoul, South Korea, BS, Massachusetts Institute of Technology '96, MS, Massachusetts Institute of Technology '97, Program: Doctor of Medicine, 2004 Graduate, Pediatrics, St. Louis Children's Hospital, St. Louis, MO

**Kyle Jennings Eash** Bloomington, IL, BA, Illinois Wesleyan University '02, Program: Master of Arts/ Doctor of Medicine, Master of Arts

**Brian Todd Edelson** Roslyn, NY, BS, Brown University '95, Program: MSTP, 2004 Graduate, Pathology/Laboratory Medicine, Barnes-Jewish Hospital, St. Louis, MO

**Justis Potter Ehlers** Maryville, MO, BS, University of Notre Dame '00, Program: Doctor of Medicine, 2004 Graduate, Internal Medicine-Preliminary, St. Luke's Hospital, St. Louis, MO, Ophthalmology, Wills Eye Hospital, Philadelphia, PA

**Charlene Ann Ellsworth** Program: Doctor of Medicine, First Year Medical Student

**Mary Adel Elmasri** Laguna Niguel, CA, BA, University of California, Berkeley '02, Program: Doctor of Medicine, Second Year Medical Student

**Rachel Marie Engen** Program: Doctor of Medicine, First Year Medical Student

**Edward Manuel Esparza** San Antonio, TX, BA, Princeton University '99, Program: MSTP, Fourth Year Research

**Jeremy Robert Etzkorn** Program: Doctor of Medicine, First Year Medical Student

**Kimberley Jane Evason** Brookfield, WI, BS, University of Iowa '98, Program: MSTP, Fourth Year Research

**Bryan Andrew Faller** Potomac, MD, BS, University of Michigan, Ann Arbor '00, Program: Doctor of Medicine, 2004 Graduate, Internal Medicine, Barnes-Jewish Hospital, St. Louis, MO

**Amy Min-chi Fang** Kokomo, IN, BS, Indiana University, Bloomington '03, Program: Doctor of Medicine, Second Year Medical Student

**David Ming-dar Fang** Kokomo, IN, BS, Indiana University, Bloomington '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Erin Corinne Farlow** Indianapolis, IN, BA, Washington University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Oluwadamilola Motunrayo Fayanju** Basking Ridge, NJ, BA, Harvard University '01, MA, Harvard University '01, Program: Doctor of Medicine, Second Year Medical Student

**Amy Ganze Feldmann** San Rafael, CA, BA, Dartmouth College '98, Program: Doctor of Medicine, 2004 Graduate, Pediatrics, University of California, San Diego, San Diego, CA

**Genoa Goetz Ferguson** Newport Beach, CA, Program: Doctor of Medicine, Elective Year

**David Ariel Fessler** Ellicott City, MD, BS, University of Michigan, Ann Arbor '98, MPH, University of Michigan, Ann Arbor '01, Program: Doctor of Medicine, Elective Year

**Elizabeth Anderson Fialkowski** Birmingham, AL, BA, Rice University '99, Program: Master of Arts/ Doctor of Medicine, 2004 Graduate, General Surgery, Barnes-Jewish Hospital, St. Louis, MO

**Sarah Alison Finger** Program: Doctor of Medicine, First Year Medical Student

**Margaret Ann Fitzpatrick** Milwaukee, WI, BS, University of Notre Dame '03, Program: Doctor of Medicine, Second Year Medical Student

**Katherine Elizabeth Fleming** Memphis, TN, BS, University of Tennessee, Knoxville '03, Program: Doctor of Medicine, Second Year Medical Student

**Denise Renea Flinn** Georgetown, TX, BA, Southwestern University '96, Program: Doctor of Medicine, Elective Year

**Nicholas Christian Foeger** Portola Valley, CA, BA, Brown University '03, Program: Doctor of Medicine, Second Year Medical Student

**Elizabeth Ellen Foglia** Columbia, MD, BS, University of Notre Dame '01, Program: Master of Arts/ Doctor of Medicine, Master of Arts

**Mackenzie Anna Ford** Princeton, IN, BA, Indiana University, Bloomington '02, Program: Master of Arts/ Doctor of Medicine, Master of Arts

**Anthony Frank Fotenos** San Francisco, CA, BS, Brown University '99, Program: MSTP, Third Year Research

**Elizabeth A Fowler** Program: Doctor of Medicine, First Year Medical Student

**Rachel Lyn Fowler** Collinsville, IL, BA, Washington University '00, Program: Doctor of Medicine, 2004 Graduate, Emergency Medicine, Rhode Island Hospital/Brown University, Providence, RI

**Michael David Fox** West Chester, OH, BS, Ohio State University '01, Program: MSTP, Second Year Research

**Karla Marie Fredricks** Cleveland Heights, OH, BS, Duke University '01, Program: Doctor of Medicine, Clinical Clerkship Year

**Erica Renee Freeman** Farmington Hill, MI, BA, University of Michigan, Ann Arbor '01, Program: Doctor of Medicine, Elective Year

**Adam Timothy Froemming** Alexandria, MN, BS, University of Minnesota, Twin Cities '01, Program: Doctor of Medicine, Clinical Clerkship Year

**Margo Christiane Funk** West Lafayette, IN, BS, Indiana University, Bloomington '99, Program: Master of Arts/ Doctor of Medicine, Clinical Clerkship Year

**Lauren Elizabeth Galpin** Wilmington, DE, BS, Georgetown University '99, Program: Master of Arts/ Doctor of Medicine, Master of Arts

**Noopur Gangopadhyay** Program: Doctor of Medicine, First Year Medical Student

**John Michael Gansner** Campbell River, British Columbia, Canada, BA, Harvard University '02, Program: MSTP, First Year Research

**Eric Jonas Gapud** Atlanta, GA, BS, University Georgia '02, Program: MSTP, Second Year Medical Student

**Jennifer Michelle Gardner** Leawood, KS, BS, Duke University '01, Program: Doctor of Medicine (5 Year), Research (Here)

**Anubhav Garg** Cleveland, OH, BS, Case Western Reserve University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Eugenia Catarina Garvin** Stony Brook, NY, BS, Harvard University '03, Program: Doctor of Medicine, Second Year Medical Student

**Joseph Perry Gaut** Springfield, MO, BA, Washington University '96, Program: MSTP, 2004 Graduate, General Surgery, Barnes-Jewish Hospital, St. Louis, MO

**Albert Ooguen Gee** Urbana, IL, BS, University of Illinois, Urbana-Champaign '01, Program: Doctor of Medicine, Elective Year

**Elaine Yeming Gee** Staten Island, NY, BS, New York University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Joel Charles Geerling** Saint Louis, MO, BA, Saint Louis University '01, Program: MSTP, Second Year Research

**Erica Jean Gelber** Cary, IL, BS, University of Illinois, Urbana-Champaign '00, Program: Doctor of Medicine, 2004 Graduate, Transitional Year, St. John's Mercy Medical Center, St. Louis, MO, Dermatology, Barnes-Jewish Hospital, St. Louis, MO

**David John Gerlach** Burnsville, MN, BA, Duke University '99, Program: Doctor of Medicine, 2004 Graduate, Orthopaedic Surgery, Barnes-Jewish Hospital, St. Louis, MO

**Michael John Geske** Program: Doctor of Medicine, First Year Medical Student

**Monica Ghei** Herndon, VA, BS, Duke University '03, Program: Doctor of Medicine, Second Year Medical Student

**Zahra Ghiassi-Nejad** Program: MSTP, First Year Medical Student

**Nsangou Tambangre Ghogomu** Program: Doctor of Medicine, First Year Medical Student

**Anoopindar Kaur Ghuman** Huntington Beach, CA, BS, University of California, Berkeley '00, Program: Doctor of Medicine, 2004 Graduate, Pediatrics, Children's Memorial Hospital, Chicago , IL

**Marios Giannakis** Athens, Greece, BS, University of Toronto '01, Program: MSTP, First Year Research

**Jill Elizabeth Gibson** Columbia, MO, BA, Northwestern University '01, Program: Doctor of Medicine, Elective Year

**Corey Scott Gill** Woodstock, GA, BS, University of Georgia '01, Program: Master of Arts/ Doctor of Medicine, Master of Arts

**Timothy Justin Gillenwater** Glasgow, KY, BS, Vanderbilt University '03, Program: Doctor of Medicine, Second Year Medical Student

**Jennifer Gibson Gill** Knoxville, TN, BS, University Georgia '03, Program: MSTP, Second Year Medical Student

**Maryann Tan Gimenez** Greendale, WI, BS, University of Wisconsin '95, Program: MSTP, Clinical Clerkship Year

**Yekaterina Gincherma** St. Louis, MO, BA, University of Missouri, St Louis '03, Program: Doctor of Medicine, Second Year Medical Student

**Leah R. Givens** Program: Doctor of Medicine, First Year Medical Student

**Jeffrey Avins Glassberg** Manhattan, NY, BA, University of Rochester '01, Program: Master of Arts/ Doctor of Medicine, Master of Arts

**Patricia Ellen Goldhoff** Program: Doctor of Medicine, First Year Medical Student

**Kathryn Ann Gold** Pittsburgh, PA, BS, Duke University '01, Program: Doctor of Medicine, Elective Year

**Elizabeth Leigh Goodman** Program: Doctor of Medicine, First Year Medical Student

**Anjali Gopalan** Program: Doctor of Medicine, First Year Medical Student

**Jegan Gopal** North Hollywood, CA, BS, University of California, Los Angeles '00, Program: Doctor of Medicine, Clinical Clerkship Year

**Mollie Rebecca Gordon** Houston, TX, MA, University of London '01, BA, University of Pennsylvania '00, Program: Doctor of Medicine, Elective Year

**Daniel Graesser** Program: Doctor of Medicine, First Year Medical Student

**Cheryl Ann Gray** Program: Doctor of Medicine, First Year Medical Student

**Riley Erickson Greene** Denver, CO, BS, Washington and Lee University '00, Program: Doctor of Medicine, 2004 Graduate, Transitional Year, Healthone Alliance Denver, CO, Dermatology, University of Colorado Denver, CO

**David Stanley Grenda** Las Vegas, NV, MA, BA, Harvard University '94, MH, Weston Jesuit School of Theology '98, Program: MSTP, Third Year Research

**Nicole Renee Grieselhuber** Hamilton, OH, BS, Case Western Reserve University '03, Program: MSTP, Second Year Medical Student

**Brent Griffith** Program: Doctor of Medicine, First Year Medical Student

**Jennifer Lynn Griffith** Program: MSTP, First Year Medical Student

**Andrew Alexander Grimm** Burnsville, MN, BS, Massachusetts Institute of Technology '00, Program: MSTP, Third Year Research

**Sarah Elizabeth Grosland** Elgin, IL, BS, Butler University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Elizabeth Haberfeld** New York, NY, BA, Vassar College '92, Program: Doctor of Medicine, 2004 Graduate, Internal Medicine-Preliminary, Hospital of the University of Pennsylvania, Philadelphia, PA, Neurology, Columbia University New York, NY

**Brandon Kenneth Hadland** Las Vegas, NV, BS, HARVEY MUDD COLLEGE '98, Program: MSTP, Clinical Clerkship Year

**Scott Evan Hadland** Program: Doctor of Medicine, First Year Medical Student

**Andrea Ruth Hagemann** Davenport, IA, BA, Princeton University '00, Program: Doctor of Medicine, 2004 Graduate, Obstetrics and Gynecology, Barnes-Jewish Hospital, St. Louis, MO

**Ian Sean Hagemann** Alexandria, VA, BA, Princeton University '00, Program: MSTP, Third Year Research

**Luke Tyler Hall** Harrisburg, IL, BA, Greenville College '03, Program: Doctor of Medicine, Second Year Medical Student

**Caroline Patricia Halverstam** Tenaflly, NJ, BA, Northwestern University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**David Akinyele Hampton** Bellevue, WA, BS, Massachusetts Institute of Technology '97, ME, Massachusetts Institute of Technology '97, Program: Doctor of Medicine, 2004 Graduate, General Surgery, Naval Medical Center, San Diego, CA

**Elizabeth Erica Hansen** Asheville, NC, BA, Washington University '02, Program: MSTP, Second Year Medical Student

**Joshua Thomas Hanson** Arlington, TX, BA, University of Texas, Austin '01, Program: Doctor of Medicine, Clinical Clerkship Year

**James Michael Harper** Program: MSTP, First Year Medical Student

**Lorie Michelle Harper** Carrollton, TX, BS, University of Texas, Dallas '01, BS, University of Texas, Dallas '01, Program: Doctor of Medicine, Elective Year

**Elizabeth Avis Harrison** Knoxville, TN, BS, Vanderbilt University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Vernetta Lee Harris** Kansas City, KS, BS, Trinity University '00, Program: Doctor of Medicine, 2004 Graduate, Emergency Medicine, Emory University, Atlanta, GA

**Daphne Maya Hasbani** Woodbridge, CT, BA, University of Rochester '99, BH, University of Rochester '99, Program: MSTP, Third Year Research

**Jennifer Michelle Heeley** Fenton, MO, BA, Washington University '03, Program: MSTP, Second Year Medical Student

**Jonathan William Heidt** St. Louis, MO, BS, University of Missouri, Columbia '03, Program: Doctor of Medicine, Second Year Medical Student

**Beth Ann Helmink** Program: MSTP, First Year Medical Student

**Rebecca Cappel Hendrickson** Seattle, WA, BS, University of Washington '01, Program: MSTP, Second Year Research

**Ramin Herati** Program: Doctor of Medicine, First Year Medical Student

**Cynthia Joan Herrick** The Woodlands, TX, BA, Princeton University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Jared Adam Hershenson** Indianapolis, IN, BS, Indiana University, Bloomington '99, Program: Doctor of Medicine, 2004

Graduate, Pediatrics, Johns Hopkins Hospital, Baltimore, MD

**Johann David Hertel** Lake Tomahawk, WI, BS, University of Wisconsin, Madison '00, Program: Master of Arts/ Doctor of Medicine, Clinical Clerkship Year

**Josephine Dondoyano Hidalgo** Seattle, WA, BS, Seattle University '01, BA, Seattle University '01, Program: Doctor of Medicine, Elective Year

**Jason Eric Hill** Ijamsville, MD, BA, Cornell University '02, Program: MSTP, Second Year Medical Student

**Anne Elizabeth Hinz** White Bear Lake, MN, BA, Kalamazoo College '02, Program: Doctor of Medicine, Second Year Medical Student

**Angela Christine Hirbe** Saint Louis, MO, BA, Washington University '01, Program: MSTP, Second Year Research

**Alexander Sai Chak Ho** Lincolnwood, IL, BS, University of Illinois, Chicago '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Emily Lin Ho** Rochester, NY, BS, Yale University '95, Program: MSTP, 2004 Graduate, Internal Medicine-Preliminary, University of Colorado, Denver, CO, Neurology, University of California, San Francisco, San Francisco, CA

**August Alexander Hofling** Cream Ridge, NJ, BA, Cornell University '96, Program: MSTP, Clinical Clerkship Year

**Terrence Fletcher Holekamp** Columbia, MO, BA, Amherst College '99, Program: MSTP, Third Year Research

**Mai-Lan Ho** Program: Doctor of Medicine, First Year Medical Student

**Kristen Joy Homes** Phoenix, AZ, BA, University of Colorado, Boulder '00, Program: Doctor of Medicine, 2004 Graduate, Emergency Medicine, Carolinas Medical Center, Charlotte, NC

**Stacy Rebecca Hood** Program: Doctor of Medicine, First Year Medical Student

**David James Hormozdi** Program: Doctor of Medicine, First Year Medical Student

**Laura Marie Houser** Schaumburg, IL, BA, Lawrence University '03, Program: Doctor of Medicine, Second Year Medical Student

**Tony Yun Hsu** Godfrey, IL, BS, University of Illinois, Urbana-Champaign '00, Program: Doctor of Medicine, 2004 Graduate, Emergency Medicine, University of Illinois - St. Francis Medical Ctr, Peoria, IL

**May S.R. Hua** New York, NY, BA, Harvard University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Jessica Szu-chieh Huang** Athens, GA, BS, Yale University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Xiaoxue Huang** Baltimore, MD, BA, University of Maryland, Baltimore '02, Program: Doctor of Medicine, Second Year Medical Student

**Yihung Huang** Taipei, Taiwan, BS, Stanford University '99, BA, Stanford University '99, Program: Doctor of Medicine, 2004 Graduate, Internal Medicine, Barnes-Jewish Hospital, St. Louis, MO

**Calvin Takuo Hu** Phoenix, AZ, BA, University of California, Berkeley '98, MS, University of Washington '01, Program: Doctor of Medicine, Clinical Clerkship Year

**William John Hucker** St. Louis, MO, BS, Washington University '01, Program: MSTP, First Year Research

**Rachel Marilyn Huckfeldt** Bloomington, IN, BA, Washington University '01, Program: MSTP, Second Year Research

**James Chalmers Hudspeth** New York, NY, BA, Columbia University '02, Program: Doctor of Medicine, Second Year Medical Student

**John Christian Huetsch** Waterloo, IL, BA, Harvard University '03, Program: Doctor of Medicine, Second Year Medical Student

**Inna Hughes** St. Louis, MO, BA, Williams College '99, AA, Simon's Rock College of Bard '97, Program: MSTP, Fourth Year Research

**Alisen Brie Huske** Elgin, IL, BA, Washington University '01, Program: Doctor of Medicine, Elective Year

**Shane Y. Inoue** Honolulu, HI, BS, University of Hawaii, Manoa '00, Program: Doctor of Medicine, 2004 Graduate, Orthopaedic Surgery, University of Hawaii Honolulu, HI

**Joseph Edward Ippolito** Fort Lauderdale, FL, BS, Cornell University '98, Program: MSTP, Fifth Year Research

**Heba Nagi Iskandar** Rock Island, IL, BA, Augustana College '03, Program: Doctor of Medicine, Second Year Medical Student

**Amir M Islami-Manuchehry** Waterloo, IA, BA, Northwestern University '99, Program: Doctor of Medicine, 2004 Graduate, Transitional Year, Evanston NW Health Care, Evanston, IL, Anesthesiology, Brigham & Women's Hospital, Boston, MA

**Benjamin Clark Jacobs** Program: Doctor of Medicine, First Year Medical Student

**Christina Marie Jacobsen** Baltimore, MD, BA, The Johns Hopkins University '97, Program: MSTP, Clinical Clerkship Year

**Meagan Anne Jacoby** Baltimore, MD, BA, Johns Hopkins University '96, Program: MSTP, Clinical Clerkship Year

**Alvin Curtis James** Sutherland, VA, BS, Virginia Commonwealth University '03, Program: Doctor of Medicine, Second Year Medical Student

**Omar Waleed Jassim** Champaign, IL, BS, University of Illinois, Urbana '97, Program: MSTP, Clinical Clerkship Year

**Christopher Alan Johnson** Kailua, HI, BS, Williamette University '99, Program: Doctor of Medicine, 2004 Graduate, Emergency Medicine, Drexel (MCP Hahnemann) University College of Med, Philadelphia, PA

**Hillary Danielle Johnson** Iowa City, IA, BS, University of Iowa '95, Program: MSTP, 2004 Graduate, Internal Medicine-Preliminary, Beth Israel Deaconess Medical Center, Boston, MA, Dermatology, New York University School of Medicine, New York, NY

**Angela Eve Jones** Redmond, WA, BS, University of Washington, Seattle '99, Program: Doctor of Medicine, 2004 Graduate, Orthopaedic Surgery, George Washington University, Washington, DC

**Anna Helena Jonsson** Kansas City, MO, BA, Harvard University '03, Program: MSTP, Second Year Medical Student

**Albert Changwon Ju** Bethel Park, PA, BA, Harvard University '00, Program: Doctor of Medicine, 2004 Graduate, Transitional Year, Georgetown University Hospital, Washington, DC, Anesthesiology, New York Presbyterian Hospital-Columbia, New York, NY

**Enjae Jung** Lacey, WA, BS, University of Washington, Seattle '01, Program: Doctor of Medicine, Clinical Clerkship Year

**Jae Y. Jung** Pleasanton, CA, PhD, Washington University '01, BS, University of California, Davis '95, Program: Doctor of Medicine, Elective Year

**Yasha Kadkhodayan** Collinsville, IL, BS, University of Illinois at Chicago '01, Program: Doctor of Medicine, Elective Year

**Scott Patrick Kaiser** Program: Doctor of Medicine, First Year Medical Student

**Grace Kao** Montville, NJ, BA, Harvard University '01, Program: MSTP, First Year Research

**Natasha S. Kasbekar** Chicago, IL, BS, University of Illinois, Chicago '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Narayanan Kasthuri** Morris Plains, NJ, BA, Princeton University '96, Program: Master of Arts/ Doctor of Medicine, Clinical Clerkship Year

**Bryson William Katona** Silver Spring, MD, BA, University of Pennsylvania '02, MS, University of Pennsylvania '02, Program: MSTP, First Year Research

**Andrew Leon Kau** St. Louis, MO, BS, Emory University '98, Program: MSTP, Fourth Year Research

**Julia Anne Kauffman** Program: Doctor of Medicine, First Year Medical Student

**Jennifer Erin Kaufman** Germantown, TN, BS, University of Michigan, Ann Arbor '99, Program: Doctor of Medicine, 2004 Graduate, Pediatrics, St. Louis Children's Hospital, St. Louis, MO

**Nada Mufid Kawar** Montrose, CA, BS, University of California, Los Angeles '98, Program: Doctor of Medicine, Elective Year

**James Edward Kelly** St. Louis, MO, BS, University of Notre Dame '99, Program: Master of Arts/ Doctor of Medicine, Elective Year

**Jamie Dawn Kemp** Campbellsville, KY, BS, University of Kentucky '00, Program: Doctor of Medicine, 2004 Graduate, Internal Medicine, Rhode Island Hospital/Brown University, Providence, RI

**Alistair Juel Kent** Program: Doctor of Medicine, First Year Medical Student

**Aparna Hemant Kesarwala** Belle Mead, NJ, BA, Princeton University '00, Program: MSTP, Third Year Research

**Jason David Keune** St. Louis, MO, BA, Washington University '97, Program: Doctor of Medicine, Clinical Clerkship Year

**Bernard Khor** St. Louis, MO, BS, Massachusetts Institute of Technology '98, Program: MSTP, Fifth Year Research

**Elizabeth Ann Kidd** San Mateo, CA, BA, Pomona College '00, Program: Doctor of Medicine, Elective Year

**Edy Yong Kim** Bloomfield Hills, MI, BA, Harvard University '97, Program: MSTP, Fifth Year Research

**Elma Eunjung Kim** Korea,, BA, Emory University '00, Program: Doctor of Medicine, Master of Arts

**Lauren Marie Kim** Jasper, AL, BA, Harvard University '99, Program: Master of Arts/ Doctor of Medicine, Second Year Master of Arts

**Andrew Marshall King** Program: Doctor of Medicine, First Year Medical Student

**Erick N. Kinyungu** Limuru, Kenya, BS, University of Nebraska, Lincoln '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Jeffery Michael Klco** Perry, OH, BS, Boston College '98, Program: MSTP, Third Year Research

**Michael Ryan Klein** Program: Doctor of Medicine, First Year Medical Student

**Jeffrey Alan Knipstein** Carmel, IN, BA, Washington University '99, Program: Doctor of Medicine, 2004 Graduate, Pediatrics, University of Michigan Hospitals, Ann Arbor, MI

**Eric Marshall Knoche** Mt. Vernon, IL, BS, Davidson College '01, Program: Doctor of Medicine, Clinical Clerkship Year

**Sarah G Kovnar** Program: Doctor of Medicine, First Year Medical Student

**Beth Ann Kozel** Richmond Heights, MO, BA, Washington University '96, Program: MSTP, 2004 Graduate, Pediatrics, St. Louis Children's Hospital, St. Louis, MO

**Marie Alana Kozel** Program: Doctor of Medicine, First Year Medical Student

**Benjamin Charles Kramer** Bel Air, MD, BS, University of North Carolina, Chapel Hill '03, Program: Doctor of Medicine, Second

Year Medical Student

**Maxwell Masters Krem** Chesterfield, MO, BA, Washington University '97, Program: MSTP, 2004 Graduate, Internal Medicine, Barnes-Jewish Hospital, St. Louis, MO

**Tarun Neeraj Kukreja** Chicago, IL, BA, University of Illinois, Urbana-Champaign '99, Program: Doctor of Medicine, Elective Year

**Sonal Kumar** Saint Louis, MO, BA, Washington University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Terrance Thomas Kummer** Rochester, MN, BS, University of Minnesota '99, Program: MSTP, Fourth Year Research

**Elisabeth Marta Kuper** Papillion, NE, BS, University of Nebraska, Lincoln '03, Program: Doctor of Medicine, Second Year Medical Student

**Shana Kusin** Houston, TX, BA, Columbia University '97, Program: Doctor of Medicine, Second Year Medical Student

**Rita Ophelia Kwan** Clovis, NM, BS, Creighton University '00, Program: Doctor of Medicine, 2004 Graduate, General Surgery, University of California, San Francisco-East Bay, San Francisco, CA

**Michael Kwiatt** Program: Doctor of Medicine, First Year Medical Student

**Molly Lauren Lacy** Pittsburgh, PA, BA, Dartmouth College '00, Program: Doctor of Medicine, 2004 Graduate, Pediatrics, St. Louis Children's Hospital, St. Louis, MO

**Andrew Alan Lane** St. Louis, MO, BH, Vanderbilt University '98, Program: MSTP, Clinical Clerkship Year

**Jakub Stuart Langer** Salem, OR, BS, University of Notre Dame '01, Program: Doctor of Medicine, Elective Year

**Joshua Craig Langhorne** Dallas, TX, BA, Washington University '03, Program: Doctor of Medicine, Second Year Medical Student

**Lori Loraine LaRiviere** Chico, CA, BS, California State University '98, MS, University of California, Santa Barbara '01, Program: Doctor of Medicine, Clinical Clerkship Year

**Gina Nicole LaRossa** Rochester, NY, BS, Yale University '01, Program: Doctor of Medicine, Second Year Medical Student

**Michelle Lyn Larson** Great Falls, MT, BA, University of Rochester '97, Program: Doctor of Medicine, Elective Year

**Manchunjeff Lau** Macau, Hong Kong, BA, Washington University '00, Program: MSTP, Third Year Research

**Wei Ling Lau** Kuala Lumpur, Malaysia, BS, Trent University '01, AS, Prime College - Malaysia '98, Program: Doctor of Medicine, Elective Year

**Kory Joshua Lavine** Detroit, MI, BS, University of Rochester '01, Program: MSTP, Second Year Research

**Ann Marie Leathersich** Rochester, NY, BS, St. Lawrence University '97, Program: Doctor of Medicine, Clinical Clerkship Year

**Rachel Leah Lecha** Livermore, CA, BS, University of San Francisco '98, Program: Master of Arts/ Doctor of Medicine, 2004 Graduate, Transitional Year, Forest Park Hospital, St. Louis, MO, Anesthesiology, Stanford University Programs, Stanford, CA

**Christopher William Lee-Messer** San Jose, CA, BA, Harvard University '90, Program: MSTP, 2004 Graduate, Pediatrics, University of California, San Francisco, San Francisco, CA

**Aaron Yuntai Lee** Program: Doctor of Medicine, First Year Medical Student

**Andrew Bryant Lee** Newport Coast, CA, BS, Stanford University '00, Program: Doctor of Medicine, Elective Year

**Annie Chia-San Lee** Edwardsville, PA, BA, Harvard University '00, Program: Doctor of Medicine, 2004 Graduate, Transitional Year, St. Louis University School of Medicine, St. Louis, MO, Ophthalmology, Duke University Eye Center, Durham, NC

**Anson Michael Lee** San Diego, CA, BS, University of California, San Diego '01, Program: Doctor of Medicine, Elective Year

**Chung Albert Lee** Overland Park, KS, BA, The Johns Hopkins University '02, Program: MSTP, First Year Research

**Eugene Whan Lee** Program: Doctor of Medicine, First Year Medical Student

**Eunice Suejin Lee** Northfield, IL, BA, Princeton University '95, Program: Master of Arts/ Doctor of Medicine, 2004 Graduate, Transitional Year, Santa Clara Valley Medical Center, San Jose, CA, Anesthesiology, University of California, San Francisco, San Francisco, CA

**Frances Wen-Hui Lee** Potomac, MD, BA, University of Pennsylvania '03, Program: Doctor of Medicine, Second Year Medical Student

**Jessica Mary Lee** Columbia, MO, BA, Stanford University '01, Program: Doctor of Medicine, Second Year Medical Student

**Katherine Bao-Shian Lee** Indianapolis, IN, BA, Washington University '03, Program: MSTP, Second Year Medical Student

**Steve Chunyu Lee** Wappingers Falls, NY, BS, Brigham Young University '01, Program: Doctor of Medicine, Elective Year

**Amy Qin-Qin Lei** San Francisco, CA, BS, University of California, Davis '00, Program: Doctor of Medicine, Clinical Clerkship Year

**Andrew Tibor Leitner** Program: Doctor of Medicine, First Year Medical Student

**Nam Hoai Le** Fort Smith, AR, BS, University of Arkansas '96, Program: MSTP, Clinical Clerkship Year

**Liza Leung** New York City, NY, BS, Massachusetts Institute of Technology '02, Program: Doctor of Medicine, Second Year



Medical Student

**David Sexton Lewis** Durham, NH, BA, Williams College '03, Program: Doctor of Medicine, Second Year Medical Student

**Beth Marie Lewkowski** Cheyenne, WY, BS, University of Wyoming '00, AS, Laramie County Community College '98, MS, University of Wyoming '01, Program: Doctor of Medicine, Elective Year

**Ling-Chih Liang** San Diego, CA, BA, University of California, Berkeley '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Jane Li** Hong Kong,, BA, Rice University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Katy Cheekuan Li** San Francisco, CA, BA, University of California-Berkeley '01, Program: Doctor of Medicine, Elective Year

**Carol Alice Lin** Tustin, CA, BS, Stanford University '01, BA, Stanford University ', Program: Doctor of Medicine, Clinical Clerkship Year

**Annette Elizabeth Lindblom** Minneapolis, MN, BS, Tulane University '00, MS, Tulane University '00, Program: Doctor of Medicine, 2004 Graduate, Anesthesiology, University of Chicago Hospital, Chicago, IL

**Robert Coleman Lindsley** Philadelphia, PA, BA, Swarthmore College '98, Program: MSTP, Second Year Research

**Hui-chung Ling** Westborough, MA, BS, University of Massachusetts '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Mike Yuhcheng Lin** Davis, CA, BS, University of California, Davis '96, Program: MSTP, Fifth Year Research

**Steven Kuei-Ku Lin** Virginia Beach, VA, BS, Duke University '01, Program: Doctor of Medicine, Elective Year

**Yiing Lin** Mayfield Village, OH, BS, Duke University '96, Program: MSTP, Clinical Clerkship Year

**Daniel Zhidi Liu** Conway, AR, BA, Hendrix College '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Masha Jean Livhits** Los Angeles, CA, BS, California State University, Los Angeles '01, Program: Doctor of Medicine, Elective Year

**Brendan Matthew Lloyd** Seattle, WA, BA, Harvard University '00, Program: Doctor of Medicine, Second Year Medical Student

**Sameer Jagan Lodha** Mexico City, Mexico, BA, Harvard University '99, Program: Doctor of Medicine, Second Year Medical Student

**Timothy Christopher Loftus** Springfield, IL, BS, University of Illinois, Urbana-Champaign '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Mindy S. Lo** Potomac, MD, BA, The Johns Hopkins University '97, Program: MSTP, Fifth Year Research

**David Lortscher** Program: Doctor of Medicine, First Year Medical Student

**Junyang Lou** Indianapolis, IN, BS, Indiana University, Bloomington '99, Program: MSTP, Fourth Year Research

**Scott Benjamin Lovitch** Old Tappan, NJ, BA, Harvard University '99, Program: MSTP, Fourth Year Research

**Christine Maria Lovly** Williston Park, NY, BA, The Johns Hopkins University '97, Program: MSTP, Sixth Year Research

**Ryan David Luginbuhl** Program: Doctor of Medicine, First Year Medical Student

**Ji Lu** Davis, CA, BS, University of California, San Diego '00, Program: Doctor of Medicine, Elective Year

**Michael T. Lu** Somerset, NJ, BS, Temple University '01, Program: Doctor of Medicine, Elective Year

**James Weldon Maas** St. Louis, MO, BS, Stanford University '97, Program: MSTP, Fifth Year Research

**Luigi Maccotta** Philadelphia, PA, BS, St. Peter's College '94, Program: MSTP, Clinical Clerkship Year

**Matthew Reagan Macewan** Program: MSTP, First Year Medical Student

**Andrew John Maclellan** Program: Doctor of Medicine, First Year Medical Student

**Daniel J. Ma** Charlotte, NC, BS, Rice University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Kate Madden** Ithaca, NY, BA, Brown University '99, Program: Doctor of Medicine, 2004 Graduate, Pediatrics, Children's Hospital, Boston, MA

**Jeffrey Alan Magee** Madison, WI, BS, University of Wisconsin, Madison '97, Program: MSTP, Clinical Clerkship Year

**Sajan Thapar Mahajan** Baton Rouge, LA, BA, Washington University '01, Program: Doctor of Medicine, Elective Year

**Michael Anthony Mahowald** Chicago, IL, BA, Swarthmore College '99, Program: MSTP, First Year Research

**Leah Ruth Malhotra** La Honda, CA, BA, Dartmouth College '00, Program: Doctor of Medicine, Second Year Medical Student

**Robert M. Mallery** Program: Doctor of Medicine, First Year Medical Student

**Azad Mansouri** Tehran, Israel, BA, University of Texas, Austin '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Scott Benjamin Marrus** University City, MO, BA, Brandeis University '96, Program: MSTP, Clinical Clerkship Year

**Erin June Martens** Program: Doctor of Medicine, First Year Medical Student

**Carlo Obet Martinez** Valley Park, MO, BS, University of Texas, San Antonio '99, Program: Doctor of Medicine (6 Year), Elective

Year

**Ricard Masia** Barcelona, Spain, BA, Cornell University '00, Program: MSTP, Third Year Research

**Sahar Lucy Masoudi** Lake Forest, CA, BS, University of California, Los Angeles '02, Program: Doctor of Medicine, Second Year Medical Student

**Corey Michael McCann** Oley, PA, BS, The Pennsylvania State University '01, Program: MSTP, Second Year Research

**Stephen Andrew McCartney** Program: MSTP, First Year Medical Student

**Megan Anne McCarville** Evanston, IL, BA, Northwestern University '00, Program: Doctor of Medicine, Clinical Clerkship Year

**James Scott McClellan** Anniston, AL, BS, Birmingham-Southern College '97, Program: MSTP, Clinical Clerkship Year

**William Howard McCoy** Sewickley, PA, BS, University of Pittsburgh '02, Program: MSTP, First Year Research

**Sharon Suzanne McDaniel** San Diego, CA, BA, Pomona College '99, Program: Doctor of Medicine, Elective Year

**Kathleen Elizabeth Mckeon** Program: Doctor of Medicine, First Year Medical Student

**Megan Heather McKinnon** Santa Barbara, CA, BA, Oberlin College '00, Program: Doctor of Medicine, 2004 Graduate, Internal Medicine/Emergency Medicine, Allegheny General Hospital, Pittsburgh, PA

**Terri Michele McMillan** Dayton, OH, BS, Washington University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Katherine Graverend McMullin** St. Louis, MO, BA, Amherst College '01, Program: Doctor of Medicine, Second Year Medical Student

**Adam Christopher Meadows** Program: Doctor of Medicine, First Year Medical Student

**Ifeyanyichuk Megwalu** Program: Doctor of Medicine, First Year Medical Student

**Uchechukwu Chukwudozie Megwalu** Toronto, Canada, BS, McMaster University '03, Program: Doctor of Medicine, Clinical Clerkship Year

**Sigrid Birgitta Melander** Leawood, KS, BA, Washington University '00, Program: Doctor of Medicine, 2004 Graduate, Obstetrics and Gynecology, New York University School of Medicine, New York, NY

**Bryce Abram Mendelsohn** San Diego, CA, BA, Emory University '02, Program: MSTP, First Year Research

**Nicole Renee Mercer Bolton** Wichita, KS, BA, University of Kansas '97, MS, University of Kansas Medical Center '99, Program: Doctor of Medicine, Clinical Clerkship Year

**Katherine Mercer** Program: Doctor of Medicine, First Year Medical Student

**Samuel Andrew Merrill** Program: MSTP, First Year Medical Student

**Krist Tony Milin** Burke, VA, BS, Duke University '03, Program: Doctor of Medicine, Second Year Medical Student

**Bradley Ress Miller** Indianapolis, IN, BS, New York University '01, Program: MSTP, First Year Research

**Brian Christopher Miller** Cincinnati, OH, BA, Princeton University '03, Program: MSTP, Second Year Medical Student

**Lindsay Anne Miller** Scottsdale, AZ, BS, University of Arizona '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Albert L. Misko** Coral Springs, FL, BS, University of Florida '03, Program: MSTP, Second Year Medical Student

**Nia Schwann Mitchell** New Orleans, LA, BS, Tulane University '94, MS, University of Virginia '96, Program: Doctor of Medicine, Elective Year

**Gita Natwar Mody** Charlotte, NC, BS, Vanderbilt University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Douglas Matthew Moeckel** Peoria, IL, BS, University of Illinois, Urbana-Champaign '02, Program: Doctor of Medicine, Second Year Medical Student

**Michelle H Moniz** Program: Doctor of Medicine, First Year Medical Student

**Michael Christoph Montana** Program: MSTP, First Year Medical Student

**Robert Paul Moore** Staten Island, NY, BA, New York University '00, Program: Doctor of Medicine, 2004 Graduate, Internal Medicine-Preliminary, Barnes-Jewish Hospital, St. Louis, MO, Anesthesiology, New York Presbyterian Hospital-Columbia, New York, NY

**Percy Francisco Morales** Chicago, IL, BS, University of Illinois, Urbana-Champaign '00, Program: Doctor of Medicine, Elective Year

**Kelsey James Moran** Lincoln, NE, BS, University of Nebraska, Lincoln '00, Program: Doctor of Medicine, 2004 Graduate, Transitional Year, St. John's Mercy Medical Center, St. Louis, MO, Diagnostic Radiology, Barnes-Jewish Hospital, St. Louis, MO

**Elizabeth Amy Morgan** Wilton, CT, BA, Dartmouth College '00, Program: MSTP, First Year Research

**Michael Land Morgan** Mccomb, MS, BA, Rice University '97, BS, University of Mississippi '00, Program: MSTP, Second Year Research

**Daniel Franklin Morris** Santa Monica, CA, BS, Massachusetts Institute Of Technology '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Elizabeth Andrea Moulton** Columbus, OH, BS, University of North Carolina, Chapel Hill '02, Program: MSTP, First Year Research

**Patrick Daniel Munson** Livonia, MI, BS, United States Military Academy '95, Program: Doctor of Medicine, Clinical Clerkship Year

**Palaniappan Ganesh Muthappan** Murrysville, PA, BS, University of Michigan, Ann Arbor '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Valliammai Muthappan** Program: Doctor of Medicine, First Year Medical Student

**Jacob Ward Nadler** Buffalo, NY, BS, University of Pittsburgh '01, Program: MSTP, Second Year Research

**Elna Mieko Nagasako** Hilo, HI, BA, Pomona College '91, PHD, University of Rochester '01, Program: Doctor of Medicine, Clinical Clerkship Year

**Megan Okumoto Nakashima** Honolulu, HI, Program: Doctor of Medicine, Second Year Medical Student

**Jason Lynn Nelles** St Charles, MO, BS, Case Western Reserve University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Kari Lynn Nelson** Program: Doctor of Medicine, First Year Medical Student

**Jeffrey Jerome Nepple** Carroll, IA, BS, Truman State University '03, Program: Doctor of Medicine, Second Year Medical Student

**Paula Genese Newton** Bowie, MD, BS, Vanderbilt University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Robert Sheppard Nickel** Program: Doctor of Medicine, First Year Medical Student

**Eric James Nordsieck** Program: Doctor of Medicine, First Year Medical Student

**Aaron John Norris** Colorado Springs, CO, BA, Colorado State University '01, Program: MSTP, Second Year Medical Student

**Amy Kathleen Nunnikhoven** Memphis, TN, BA, Rice University '00, Program: Doctor of Medicine, 2004 Graduate, Pediatrics, St. Louis Children's Hospital, St. Louis, MO

**Grant Edward Nybakken** Piedmont, CA, BS, Haverford College '00, Program: MSTP, Third Year Research

**Cara Louise O'Brien** Coral Springs, FL, BA, Harvard University '99, Program: Doctor of Medicine, 2004 Graduate, Internal Medicine, Duke University Medical Center, Durham, NC

**Shannon Eileen O'Mahar** Milwaukee, WI, BS, Stanford University '00, Program: Doctor of Medicine, Elective Year

**Kwadwo Asare Oduro Jr.** Program: MSTP, First Year Medical Student

**Jung Duk Oh** Staten Island, NY, BA, University of Pennsylvania '98, Program: MSTP, Fifth Year Research

**Nitin Ohri** New Hyde Park, NY, BS, Columbia University '03, Program: Doctor of Medicine, Second Year Medical Student

**Oluwafunmil Tabit Okuyemi** Program: Doctor of Medicine, First Year Medical Student

**Osarenoma Uhumwunwa Olomu** Okemos, MI, BA, University of California, Berkeley '02, Program: Doctor of Medicine, Second Year Medical Student

**Jeffrey Robert Olsen** Morton Grove, IL, BS, University of Illinois, Urbana-Champaign '03, Program: Doctor of Medicine, Second Year Medical Student

**Stephen Michael Olson** Cedar Rapids, IA, BS, University of Northern Iowa '03, Program: Doctor of Medicine, Second Year Medical Student

**Ephrem Odoy Olweny** Kampala, Uganda, BA, Macalester College '98, Program: Doctor of Medicine, 2004 Graduate, Urology, University of California, San Francisco, San Francisco, CA

**Omoniyi Omojowolo Omotoso** Ilesa, Nigeria, BA, Baylor University '00, Program: Doctor of Medicine, 2004 Graduate, Pediatrics, Children's Hospital, Oakland, CA

**Tochukwu Obinna Onuora** Rothesay, NE, BS, University of Toronto '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Bradley William Ornstein** Princeton, NJ, BS, University of Washington, Seattle '01, Program: Doctor of Medicine, Elective Year

**Jeremy Elliot Orr** Program: Doctor of Medicine, First Year Medical Student

**Jese Ernest Otero** Program: MSTP, First Year Medical Student

**Rebecca Dawn Pace** Kinnelon, NJ, BA, Yale University '00, Program: Doctor of Medicine, 2004 Graduate, Psychiatry, Harvard Longwood Training Program, Boston, MA

**Nathan Clarke Page** Clayton, CA, BA, Brigham Young University '00, Program: Doctor of Medicine, 2004 Graduate, Surgery-Preliminary, Barnes-Jewish Hospital, St. Louis, MO, Otolaryngology, Washington University Program, St. Louis, MO

**Benjulian Agustin Palanca** Everett, WA, BS, University of Washington '97, Program: MSTP, Clinical Clerkship Year

**Christopher John Pannucci** Naperville, IL, BS, Indiana University, Bloomington '01, Program: Doctor of Medicine, Elective Year

**Archit Vipul Patel** Irvine, CA, BS, Washington University '01, Program: Doctor of Medicine, Elective Year

**Avani Vaudev Patel** Program: Doctor of Medicine, First Year Medical Student

**Gaurav Hiren Patel** Evansville, IN, BA, Washington University '99, Program: MSTP, Third Year Research

**Kaushal Vinod Patel** Program: Doctor of Medicine, First Year Medical Student

**Dominic Patrick Patillo** Salt Lake City, UT, BS, Harvard University '00, Program: Doctor of Medicine, 2004 Graduate, Orthopaedic Surgery, University of Missouri-Columbia Program, Columbia, MO

**Edward Scott Paxton** Wichita, KS, BS, University of Kansas '03, Program: Doctor of Medicine, Second Year Medical Student

**Lindsay Anne Peakman** Englewood, CO, BS, Wheaton College '00, Program: Doctor of Medicine, 2004 Graduate, Pediatrics, St. Louis Children's Hospital, St. Louis, MO

**Lora Rebecca Pearlman** Carbondale, IL, BA, The Johns Hopkins University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Sean Coenen Peden** Program: Doctor of Medicine, First Year Medical Student

**Lorraine Cheryl Pelosof** Dallas, TX, BS, University of Texas, Austin '97, BA, University of Texas, Austin '97, Program: MSTP, Sixth Year Research

**James Nicholas Peros** San Francisco, CA, BS, Stanford University '00, Program: Doctor of Medicine, 2004 Graduate, Internal Medicine, Fletcher Allen Health Care-University of Vermont, Burlington, VT

**Virginia Margaret Pierce** Shaker Heights, OH, BS, Brown University '00, Program: Doctor of Medicine, Elective Year

**Jason Alan Pietryga** Grand Blanc, MI, BS, University of Michigan, Ann Arbor '02, Program: Doctor of Medicine, Second Year Medical Student

**Elyse Dara Pine** Plainview, NY, BA, Case Western Reserve University '00, Program: Doctor of Medicine, 2004 Graduate, Pediatrics, Mt. Sinai Hospital, New York, NY

**Joyce Marie Pingsterhaus** Germantown, IL, BA, Northwestern University '99, Program: Doctor of Medicine, 2004 Graduate, Did not match in specialty choice, ,

**Jessica Erin Pittman** Takoma Park, MD, BA, Oberlin College '98, Program: Doctor of Medicine, 2004 Graduate, Pediatrics, University of Washington Affiliated Hospitals, Seattle, WA

**Joel Meyer Pomerantz** Pittsburgh, PA, BS, Yale University '01, Program: Doctor of Medicine, Elective Year

**Daniel Lewis Popkin** Nashville, TN, BA, Princeton University '97, Program: MSTP, 2004 Graduate, Internal Medicine-Preliminary, Barnes-Jewish Hospital, St. Louis, MO, Dermatology, Barnes-Jewish Hospital, St. Louis, MO

**Jacob Michael Poulsen** Highland, UT, BA, Brigham Young University '03, Program: Doctor of Medicine, Second Year Medical Student

**Sujata Pramod Prabhu** Evansville, IN, BS, Duke University '02, Program: Doctor of Medicine, Second Year Medical Student

**Shilpi Pradhan** Bluefield, WV, BS, Emory University '00, Program: Doctor of Medicine, 2004 Graduate, Transitional Year, Carilion Health System, Roanoke, VA, Ophthalmology, Virginia Commonwealth University, Richmond, VA

**Craig Adam Press** Scottsdale, AZ, BS, Northwestern University '02, Program: MSTP, First Year Research

**Erwin Calvo Puente** Millsboro, DE, BA, University Delaware '03, Program: MSTP, Second Year Medical Student

**Vinaya Krishna Puppala** Program: Doctor of Medicine, First Year Medical Student

**Paymon Rahgozar** Thousand Oaks, CA, BS, University of California, Los Angeles '03, Program: Doctor of Medicine, Second Year Medical Student

**Shantia Rahimian** Rancho Palos Verdes, CA, BA, University of California, Berkeley '00, Program: Doctor of Medicine, Second Year Medical Student

**Saju Aby Rajan** Staten Island, NY, BS, Temple University '03, Program: Doctor of Medicine, Second Year Medical Student

**Brandon Aaron Ramo** Atlanta, GA, BS, University of Georgia '01, Program: Doctor of Medicine, Elective Year

**Lisette Marie Ramos** Bohemia, NY, BS, Duke University '01, Program: Doctor of Medicine, Elective Year

**Vinod Rao** Monroeville, PA, BS, Massachusetts Institute of Technology '02, Program: MSTP, First Year Research

**Brian Michael Rapp** Edwardsville, IL, BS, Washington University '02, Program: Master of Arts/ Doctor of Medicine, Master of Arts

**Amanda Kate Raya** Program: Doctor of Medicine, First Year Medical Student

**Heidi Johanna Rayala** St Louis, MO, BA, Macalester College '95, Program: MSTP, 2004 Graduate, Surgery-Preliminary, Brigham & Women's Hospital, Boston, MA, Urology, Brigham & Women's Hospital/Harvard Program, Boston, MA

**Anjani T. Reddy** Program: Doctor of Medicine, First Year Medical Student

**Elizabeth Channing Reed** Greenbelt, MD, BS, University of Maryland, College Park '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Jennifer Lynn Reeve** Program: MSTP, First Year Medical Student

**Kristoff Rewi Reid** Davis, CA, BS, United States Military Academy '98, Program: Doctor of Medicine, Second Year Medical Student

**Andrew Rex Reinink** Program: Doctor of Medicine, First Year Medical Student

**Kristina Joy Rene** Morristown, MN, BS, Concordia University of Wisconsin '02, Program: Doctor of Medicine, Clinical Clerkship Year

**John Edward Reuter** Excelsior, MN, BS, Stanford University '00, Program: Doctor of Medicine, Second Year Medical Student

**Nicholas Gallagher Rhodes** Eau Claire, WI, BS, University of Wisconsin, Madison '03, Program: Doctor of Medicine, Second Year Medical Student

**Noor Riaz** St Louis, MO, BA, Northwestern University '03, Program: Doctor of Medicine, Second Year Medical Student

**Jeremy Benjamin Richards** Madison, WI, BA, University of Wisconsin, Madison '99, Program: Master of Arts/ Doctor of Medicine, 2004 Graduate, Internal Medicine, Boston University Medical Center, Boston, MA

**Charles Gerard Rickert** Program: Doctor of Medicine, First Year Medical Student

**Robert Vincent Ridenour** Eau Claire, WI, BS, University of Notre Dame '01, Program: Doctor of Medicine, Elective Year

**Clare Haverty Ridley** Program: Doctor of Medicine, First Year Medical Student

**Amy Elizabeth Riek** Delafield, WI, BS, University of Wisconsin, Madison '01, Program: Doctor of Medicine, Elective Year

**Richard Aaron Robison** Sierra Madre, CA, BS, California Institute of Technology '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Brandon George Rocque** Lilburn, GA, BS, University of Georgia '01, Program: Doctor of Medicine, Elective Year

**Randall John Rodrigues** San Jose, CA, BS, University of Georgia '01, Program: MSTP, Second Year Research

**Cynthia Elise Rogers** Louisville, KY, BA, Harvard University '98, Program: Doctor of Medicine, Elective Year

**Jeffrey David Roizen** Chicago, IL, BS, Williams College '00, Program: MSTP, Third Year Research

**Natalya Romaniv** Chicago, IL, BA, The University of Chicago '00, Program: Doctor of Medicine, Elective Year

**Keren Rosenblum** Potomac, MD, BA, Brown University '98, Program: Doctor of Medicine, 2004 Graduate, Obstetrics and Gynecology, Oregon Health & Science University, Portland, OR

**David Aaron Rosen** Farmington Hills, MI, BA, University of Michigan, Ann Arbor '02, Program: MSTP, First Year Research

**Iiana Shaina Rosman** Program: Doctor of Medicine, First Year Medical Student

**Shada Amelia Rouhani** Program: Doctor of Medicine, First Year Medical Student

**Adam Gene Rouse** Program: MSTP, First Year Medical Student

**Audrey Patricia Routt** Spokane, WA, BS, Western Washington University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Susan Jennifer Rovelstad** Waynesboro, PA, BS, University of Illinois, Urbana-Champaign '98, Program: Master of Arts/ Doctor of Medicine, Elective Year

**Anthony Jerrod Rowe** Program: Doctor of Medicine, First Year Medical Student

**Stacey Leigh Rubin** Elkins Park, PA, BA, Cornell University '99, Program: Doctor of Medicine, Clinical Clerkship Year

**Roe Elan Rubinstein** Sharon, MA, BA, Harvard University '00, Program: Doctor of Medicine, 2004 Graduate, Plastic Surgery, University Health Center of Pittsburgh, Pittsburgh, PA

**Karen Elaine Rushe** Vestal, NY, BS, University of Pittsburgh '01, Program: Doctor of Medicine, Elective Year

**Wesley Alan Russell** Program: Doctor of Medicine, First Year Medical Student

**Dana Lin Sacco** Sebring, FL, BS, University Of Florida '00, AA, South Florida Community College '98, Program: Doctor of Medicine, Second Year Medical Student

**Michael George Sacerdote** Program: Doctor of Medicine, First Year Medical Student

**Justin Samuel Sadhu** Frankfort, IL, BS, University of Illinois, Chicago '03, Program: Doctor of Medicine, Second Year Medical Student

**Jose Bernardo Saenz** Miami, FL, BA, Cornell University '03, Program: MSTP, Second Year Medical Student

**James Riley Sagar** Arlington, VA, BA, University of Virginia '03, Program: Doctor of Medicine, Second Year Medical Student

**Mohammed Khurram Saghir** Overland Park, KS, BA, University of Pennsylvania '01, Program: Master of Arts/ Doctor of Medicine, Master of Arts

**Shirin Jacqueline Sahandy** Annapolis, MD, BS, Duke University '99, Program: Doctor of Medicine, 2004 Graduate, Internal Medicine-Preliminary, Greater Baltimore Medical Center, Baltimore, MD, Anesthesiology, Johns Hopkins Hospital, Baltimore, MD

**Paban Saha** Tallahassee, FL, BA, The Johns Hopkins University '02, MA, The Johns Hopkins University '02, Program: Doctor of

Medicine, Clinical Clerkship Year

**Heidi Linda Sandige** St. Louis, MO, BA, Northwestern University '91, MA, Yale University '93, Program: Master of Arts/ Doctor of Medicine, Elective Year

**Shailaja Janaki Sathy** Ft. Worth, TX, BA, University of Texas, Austin '01, Program: Doctor of Medicine, Elective Year

**Theodore Daniel Satterthwaite** Wilmette, IL, BA, Williams College '00, Program: Master of Arts/ Doctor of Medicine, Master of Arts

**Danielle Kaye Scheidenhelm** Belvidere, IL, BA, Coe College '01, Program: MSTP, Second Year Research

**Bruce Jeremy Schlomer** Pueblo, CO, BS, University of Virginia '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Nicole Cherie Schmitt** Las Vegas, NV, BS, University of Nevada, Las Vegas '01, Program: Doctor of Medicine, Clinical Clerkship Year

**Sandra Lynn Schurman** Program: Doctor of Medicine, First Year Medical Student

**Julie Kristina Schwarz** Lafayette, LA, BS, Duke University '95, Program: MSTP, 2004 Graduate, Internal Medicine-Preliminary, Barnes-Jewish Hospital, St. Louis, MO, Radiation Oncology, Barnes-Jewish Hospital, St. Louis, MO

**Katherine Elizabeth Schwetye** Saint Louis, MO, BA, Washington University '01, Program: Master of Arts/ Doctor of Medicine, Master of Arts

**Leon Robert Scott** Fairfax, VA, BS, University of Virginia '03, Program: Doctor of Medicine, Second Year Medical Student

**Ruth Barron Seabrook** West Orange, NJ, BA, Amherst College '00, Program: Doctor of Medicine, Elective Year

**Midori Jane Seppa** Penngrove, CA, BA, Lewis and Clark College '99, Program: MSTP, Second Year Research

**Sunitha Sequeira** Program: Doctor of Medicine, First Year Medical Student

**Venkat Seshadri** Maywood, IL, BS, Northwestern University '01, Program: Doctor of Medicine, Elective Year

**Baiju Kirtikumar Shah** Houston, TX, BA, University of Texas, Austin '00, Program: Doctor of Medicine, Second Year Medical Student

**Nirav Rasik Shah** Des Plaines, IL, BA, Northwestern University '01, Program: Doctor of Medicine, Elective Year

**Thomas Scott Shane** Greenfield, WI, BS, Emory University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Noura Mohaned Sharabash** Champaign, IL, BS, University of Illinois, Urbana-Champaign '01, Program: Doctor of Medicine, Elective Year

**Efrat Shavit** Program: Doctor of Medicine, First Year Medical Student

**Annemarie Noelle Sheets** Program: Doctor of Medicine, First Year Medical Student

**Amy Lynn Sheldahl** Hull, IA, BS, Iowa State University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**John Paul Ying-Ching Shen** Saint Louis, MO, BS, Massachusetts Institute of Technology '02, Program: Doctor of Medicine, Second Year Medical Student

**Tammy Ting-Yu Shen** Program: Doctor of Medicine, First Year Medical Student

**Yeami Marie Sheref** Program: Doctor of Medicine, First Year Medical Student

**Yelizaveta Ilinichna Sher** San Francisco, CA, BA, University of California, Berkeley '01, Program: Doctor of Medicine, Second Year Medical Student

**Arsham Sheybani** Program: Doctor of Medicine, First Year Medical Student

**Jennifer Shih** Garland, TX, BS, Massachusetts Institute of Technology '03, Program: Doctor of Medicine, Second Year Medical Student

**Leonid Shmuylovich** Newton, MA, BS, Cornell University '03, Program: MSTP, Second Year Medical Student

**Omar Khalid Siddiqi** East Greenwich, RI, BS, University of Rhode Island '03, Program: Doctor of Medicine, Second Year Medical Student

**Deepti Singh** Naperville, IL, BA, The University of Chicago '02, Program: Doctor of Medicine, Second Year Medical Student

**Amy Dianne Slansky** San Diego, CA, BS, Stanford University '00, BA, Stanford University, Program: Doctor of Medicine, 2004 Graduate, Internal Medicine, Beth Israel Deaconess Medical Center, Boston, MA

**Devon Snow** Program: Doctor of Medicine, First Year Medical Student

**Alison Kay Snyder-Warwick** Napoleon, OH, BA, Knox College '00, Program: Doctor of Medicine, 2004 Graduate, Plastic Surgery, Barnes-Jewish Hospital, St. Louis, MO

**Eric Lee Snyder** Painted Post, NY, BS, Pennsylvania State University '97, Program: MSTP, Clinical Clerkship Year

**Julia Bernard Sobol** New York, NY, BA, Harvard University '98, Program: Doctor of Medicine, 2004 Graduate, General Surgery, New York Presbyterian Hospital-Cornell New York, NY

**Celaine May So** Fort Wayne, IN, BA, University of Southern California '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Cylburn Earl Soden, Jr.** Silver Spring, MD, BS, University of Maryland '99, Program: Master of Arts/ Doctor of Medicine, 2004 Graduate, Internal Medicine-Preliminary, University of Maryland Medical Center, Baltimore, MD, Dermatology, Martin Luther King Jr/Drew Medical Center, Los Angeles, CA

**Laura Ann Sohren** Castle Rock, CO, BA, Washington University '98, Program: Doctor of Medicine, 2004 Graduate, Emergency Medicine, Thomas Jefferson University, Philadelphia, PA

**Steven Matthew Sperry** Program: Doctor of Medicine, First Year Medical Student

**Jennifer Eryn Sprague** Nashville, IN, BS, Indiana University, Bloomington '00, Program: MSTP, Third Year Research

**Seth Thomas Stalcup** Flagstaff, AZ, BS, University of Arizona '03, Program: Doctor of Medicine, Second Year Medical Student

**Ashley Lynn Steed** Roeford, NC, BS, Duke University '01, Program: MSTP, Second Year Research

**Scott Jeffrey Steiger** Coffeyville, KS, BS, Duke University '98, Program: Doctor of Medicine, Elective Year

**Jason Woods Stephenson** St. Louis, MO, BA, Stanford University '97, Program: Doctor of Medicine, 2004 Graduate, Transitional Year, St. John's Mercy Medical Center St. Louis, MO, Diagnostic Radiology, Barnes-Jewish Hospital St. Louis, MO

**Kara Ellen Sternhell** St. Louis, MO, BA, Washington University '99, Program: Master of Arts/ Doctor of Medicine, Elective Year

**Sabrina Jill Stone** Cedar Rapids, IA, BS, Iowa State University '01, Program: Doctor of Medicine, Elective Year

**Thomas Paul Stricker** Bettendorf, IA, BS, University of Iowa '97, Program: MSTP, Clinical Clerkship Year

**Russell G Strom** Program: Doctor of Medicine, First Year Medical Student

**David Wesley Strong** Southfield, MI, BA, The Johns Hopkins University '03, Program: MSTP, Second Year Medical Student

**Katherine Anne Stumpf** Quincy, IL, BA, Washington University '03, Program: Doctor of Medicine, Second Year Medical Student

**Daniel Robert Sucherman** Highland Park, IL, BA, Washington University '00, Program: Doctor of Medicine, 2004 Graduate, Transitional Year, Forest Park Hospital, St. Louis, MO, Anesthesiology, Barnes-Jewish Hospital, St. Louis, MO

**Christopher Joseph Sumey** Program: Doctor of Medicine, First Year Medical Student

**Ian Richard Paul Sunderland** Manitoba, Canada, BS, University of Toronto '01, Program: Doctor of Medicine, Elective Year

**Mythili Suntharalingam** Woodridge, IL, BA, Brandeis University '98, MS, Brandeis University '98, Program: MSTP, Clinical Clerkship Year

**Neeraj K. Surana** Evansville, IN, BS, Indiana University, Bloomington '98, BA, Indiana University, Bloomington '98, BS, Indiana University, Bloomington '98, Program: MSTP, Fifth Year Research

**Melanie Marie Sutter** Program: Doctor of Medicine, First Year Medical Student

**Pooja Manjula Swamy** Decatur, AL, BS, Emory University '01, Program: Doctor of Medicine, Elective Year

**Chad Michael Sylvester** Racine, WI, BS, University of Notre Dame '01, Program: MSTP, Second Year Research

**William Biggins Taft** Nashua, NH, BS, University of Wisconsin, Madison '00, Program: Doctor of Medicine, Elective Year

**Junko Takeshita** Ann Arbor, MI, BA, Wellesley College '98, Program: MSTP, Fifth Year Research

**Christopher Yasuyuki Tanaka** Columbia, MD, BA, University of California, Berkeley '03, Program: Doctor of Medicine, Second Year Medical Student

**Ting Yin Tao** Knoxville, TN, BA, Washington University '00, Program: MSTP, Third Year Research

**Sara Jane Taylor** Marion, IN, BS, Washington University '99, Program: MSTP, Fourth Year Research

**Shandiz Tehrani** Simi Valley, CA, BA, Occidental College '00, Program: MSTP, Third Year Research

**Lisa Dawn TenEyck** Boise, ID, BA, Scripps College '00, Program: Doctor of Medicine, 2004 Graduate, Emergency Medicine, University of Rochester Medical Center, Rochester, NY

**Anna Ruth Terry** Fort Smith, AR, BS, University of Arkansas '01, BA, University of Arkansas '01, Program: Doctor of Medicine, Second Year Medical Student

**Jennifer Nicole Thompson** Program: Doctor of Medicine, First Year Medical Student

**Jeremy Ryan Thompson** Saint Charles, MO, BS, Harding University '00, Program: Doctor of Medicine, Elective Year

**Ryan Menzies Tierney** Carmel, IN, BA, Indiana University, Bloomington '00, Program: Doctor of Medicine, 2004 Graduate, Internal Medicine-Preliminary, Barnes-Jewish Hospital, St. Louis, MO, Radiation Oncology, Barnes-Jewish Hospital, St. Louis, MO

**Divya Tiwari** Carol Stream, IL, BS, University of Illinois, Chicago '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Karrie Marie Tomiska** Oakley, CA, BS, University of California, Los Angeles '03, Program: Doctor of Medicine, Second Year Medical Student

**Kristina Ai Toncray** Peoria, IL, BS, University of Illinois, Urbana-Champaign '01, Program: Doctor of Medicine, Elective Year

**Amber Linnell Traugott** Menominee Falls, WI, BS, University of Georgia '01, AA, Monterey Peninsula College '96, AS, College of Lake County '93, Program: Doctor of Medicine, Clinical Clerkship Year

**Ilya V. Treskov** Saint Louis, MO, BS, Washington University '01, Program: MSTP, First Year Research

**James Jay Tschudy** Program: Doctor of Medicine, First Year Medical Student

**Daniel Chen Tu** Edwardsville, IL, BA, Washington University '00, Program: MSTP, Second Year Research

**Diwaker Turaga** Program: MSTP, First Year Medical Student

**Isaiah Richard Turnbull** Portland, OR, BS, University of Oregon '98, Program: MSTP, Second Year Research

**Alexander Joachim Ungewickell** St. Louis, MO, BA, Washington University '98, Program: MSTP, Fourth Year Research

**Mwiza Ushe** West Springfield, MA, BS, University of Pittsburgh '00, Program: Master of Arts/ Doctor of Medicine, Research (Here)

**Sanjeev Vaishnavi** Snellville, GA, BS, Georgia Institute of Technology '02, Program: MSTP, Second Year Medical Student

**Kristin Anne Vanderploeg** Program: Doctor of Medicine, First Year Medical Student

**Jason Lyell Vassy** Spartanburg, SC, BS, Furman University '01, Program: Doctor of Medicine, Clinical Clerkship Year

**Sunitha Vemula** Program: Doctor of Medicine, First Year Medical Student

**Atheendar Sivabala Venkataramani** Clifton Park, NY, BS, Duke University '02, Program: Doctor of Medicine, Second Year Medical Student

**John Wilson Verbsky** Milton, WI, BA, The University of Chicago '92, MA, Washington University '97, Program: MSTP, Fifth Year Research

**Vishal Verma** Charleston, WV, BS, Washington University '03, Program: Doctor of Medicine, Second Year Medical Student

**Matthew David Vesely** Tampa, FL, BA, Creighton University '03, Program: MSTP, Second Year Medical Student

**Victor Manuel Villalobos** El Paso, TX, BS, Baylor University '99, Program: MSTP, Fourth Year Research

**Joseph William Villard** Alexandria, LA, BS, Louisiana Tech University '99, MS, University of Texas, Austin '01, Program: Master of Arts/ Doctor of Medicine, Master of Arts

**Damon T Vincent** Normal, IL, BA, Washington University '96, Program: Doctor of Medicine, 2004 Graduate, Emergency Medicine, Barnes-Jewish Hospital, St. Louis, MO

**Natasha Monique Viquez** Northridge, CA, BS, University of Southern California '99, BA, University of Southern California '99, Program: MSTP, Fourth Year Research

**Yamini Vikas Virkud** Boca Raton, FL, BA, Harvard University '03, Program: Doctor of Medicine, Second Year Medical Student

**Daniel Nam Hoang Vo** Memphis, TN, BS, Vanderbilt University '01, Program: Doctor of Medicine, Clinical Clerkship Year

**Alecia C Vogel** Program: MSTP, First Year Medical Student

**Luke John Voytas** St. Louis, MO, BS, Duke University '01, Program: Doctor of Medicine, Elective Year

**Hongha Thi Vu** San Jose, CA, BA, University of California, Berkeley '01, Program: Doctor of Medicine, Second Year Medical Student

**Tracey Hope Wagner** Program: Doctor of Medicine, First Year Medical Student

**Suzanne Elizabeth Wahrle** Lakewood, CO, BS, Millsaps College '99, Program: MSTP, Third Year Research

**Julie E Walcutt** Program: Doctor of Medicine, First Year Medical Student

**Monica R Walker** Program: MSTP, First Year Medical Student

**Lindley Bevelle Wall** Columbia, MO, BS, Duke University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Karolyn Ann Wanat** Program: Doctor of Medicine, First Year Medical Student

**Michael Emmerson Ward** Byron, MN, BS, Kenyon College '99, Program: MSTP, Fourth Year Research

**Lukas Delbert Wartman** Dyer, IN, BS, University of Wisconsin, Madison '99, Program: Doctor of Medicine (5 Year), Research (Here)

**Marie Rogers Waterhouse** Washington, DC, BA, Columbia University '97, Program: Doctor of Medicine, Elective Year

**Heather Webb** Bremerton, WA, BS, Brigham Young University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Daniel Wee** Lake Forest, IL, BA, Northwestern University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Bradley Charles Weinberger** Philadelphia, PA, BA, Princeton University '01, Program: Doctor of Medicine, Elective Year

**Terrence Daniel Welch** Toledo, OH, BS, University of Notre Dame '01, Program: Doctor of Medicine, Elective Year

**Kristin Kay Wenger** North Olmsted, OH, BA, Ohio Wesleyan University '97, Program: MSTP, Fourth Year Research

**Leana Sheryle Wen** Los Angeles, CA, BS, California State University, Los Angeles '01, Program: Master of Arts/ Doctor of Medicine, Clinical Clerkship Year



**Ingrid Elizabeth Wertz** Program: Doctor of Medicine, Clinical Clerkship Year

**Michael Brandon Westover** Temecula, CA, Program: MSTP, Sixth Year Research

**Dawn Marie Wetzel** Toms River, NJ, BA, The Johns Hopkins University '98, Program: MSTP, Clinical Clerkship Year

**Brian Richard White** Program: MSTP, First Year Medical Student

**Robert Lazell White** Frederick, MD, BS, Washington University '99, Program: MSTP, Fourth Year Research

**Susan Renee Wilcox** Yukon, OK, BA, University of Oklahoma, Norman '00, Program: Doctor of Medicine, 2004 Graduate, Emergency Medicine, Brigham & Women's Hospital, Boston, MA

**Derek Edwin Williams** Lilburn, GA, BS, Vanderbilt University '03, Program: Doctor of Medicine, Second Year Medical Student

**David Mills Willis** Provo, UT, BS, Brigham Young University '96, Program: MSTP, 2004 Graduate, Internal Medicine-Preliminary, Barnes-Jewish Hospital, St. Louis, MO

**Kevin Frederick Wilson** Linden, UT, BS, Brigham Young University '01, Program: Doctor of Medicine, Elective Year

**Curtis Wilfrid Wittmann** Lincoln, NE, BA, Wesleyan University '00, Program: Doctor of Medicine, Elective Year

**Benjamin Douglas Womack** Utica, MS, BS, Mississippi State University '00, Program: Doctor of Medicine, Elective Year

**Ambrose Hon Wong** Program: Doctor of Medicine, First Year Medical Student

**Jason K. Wong** Tucson, AZ, BA, University of California, Berkeley '00, Program: Doctor of Medicine, 2004 Graduate, Emergency Medicine, Beth Israel Deaconess Medical Center, Boston, MA

**Robert Daniel Wong** Program: Doctor of Medicine, First Year Medical Student

**Vincent Kwok Wai Wong** Arcadia, CA, BS, University of California, San Diego '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Anna Woodbury** Program: Doctor of Medicine, First Year Medical Student

**Rosanna Lisa Wustrack** West Linn, OR, BA, Yale University '99, Program: Doctor of Medicine, Clinical Clerkship Year

**John David Wylie** Worthington, OH, BS, Ohio State University '00, Program: MSTP, Third Year Research

**Lisa Yun Xu** Louisville, KY, BA, Washington University '02, Program: Doctor of Medicine, Clinical Clerkship Year

**Dan Yang** Syracuse, NY, BA, Washington University '03, Program: Doctor of Medicine, Second Year Medical Student

**Louise Yeuk Yan Yeung** Los Angeles, CA, BA, Case Western Reserve University '03, Program: Doctor of Medicine, Second Year Medical Student

**Arthur Paul Young** San Mateo, CA, BS, University of California '97, Program: MSTP, Clinical Clerkship Year

**Alex Yuan** Sunrise, FL, BA, Cornell University '95, Program: MSTP, 2004 Graduate, Transitional Year, Forest Park Hospital, St. Louis, MO, Ophthalmology, UCLA/Jules Stein Eye Institute, Los Angeles, CA

**Belinda Dorothea Yu** Alamo, CA, BA, Harvard University '01, MA, Harvard University '01, Program: Doctor of Medicine, Clinical Clerkship Year

**Camille Joy Yu** Sacramento, CA, BA, Stanford University '01, Program: Doctor of Medicine, Elective Year

**Vivian Mae Yu** Edmonton, Alberta, Canada, BS, Northwestern University '00, Program: Doctor of Medicine, 2004 Graduate, Surgery-Preliminary, Hennepin County Medical Center, Minneapolis, MN, Otolaryngology, University of Minnesota, Minneapolis, MN

**Yue Yu** Los Alamos, NM, BS, University of New Mexico '99, Program: MSTP, Fourth Year Research

**Dongyang Zhang** Cape Girardeau, MO, BA, Washington University '03, Program: MSTP, Second Year Medical Student

**Kenneth Richard Ziegler** Los Angeles, CA, BA, University of California, Berkeley '01, Program: Doctor of Medicine, Second Year Medical Student

**Andrew Joseph Zimolzak** Jackson, MI, BS, Michigan State University '02, Program: Doctor of Medicine, Second Year Medical Student

**Karen Anne Zink** Schaumburg, IL, BA, University of Illinois, Urbana-Champaign '99, Program: Doctor of Medicine, 2004 Graduate, General Surgery, Oregon Health & Science University, Portland, OR

**Daniel Christian Zurcher** Program: Doctor of Medicine, First Year Medical Student

## Summary of Students in the School of Medicine

### (2003-2004)

*Doctor of Medicine and Doctor of Philosophy Degrees*  
 Graduating Class: 16

Seventh-Year Research:	1
Sixth-Year Research:	7
Fifth-Year Research:	17
Fourth-Year Research:	17
Third-Year Research:	26
Second-Year Research:	23
First-Year Research:	20
Second-Year Class:	20
First-Year Class:	26

*Doctor of Medicine and Master of Arts Degrees*

Graduating Class:	5
Trainees:	11

*Doctor of Medicine Degree*

Graduating Class:	95
Fourth-Year Class:	1
Five-Year Research Program:	1
Third-Year Class:	105
Second-Year Class:	100
First-Year Class:	96

*Doctor of Physical Therapy Degree*

Third-Year Class:	43
Second-Year Class:	57
First-Year Class:	61
Part-Time Students:	49

*Doctor of Occupational Therapy Degree*

Graduating Class:	7
Third-Year Class:	4
Second-Year Class:	11
First-Year Class:	10

*Master of Health Administration Degree*

Graduating Class:	9
First-Year Class:	20
Part-Time Students:	7

*Master of Science in Occupational Therapy Degree*

Graduating Class:	32
Second-Year Class:	30
First-Year Class:	32

*Master of Science in Psychiatric Epidemiology*

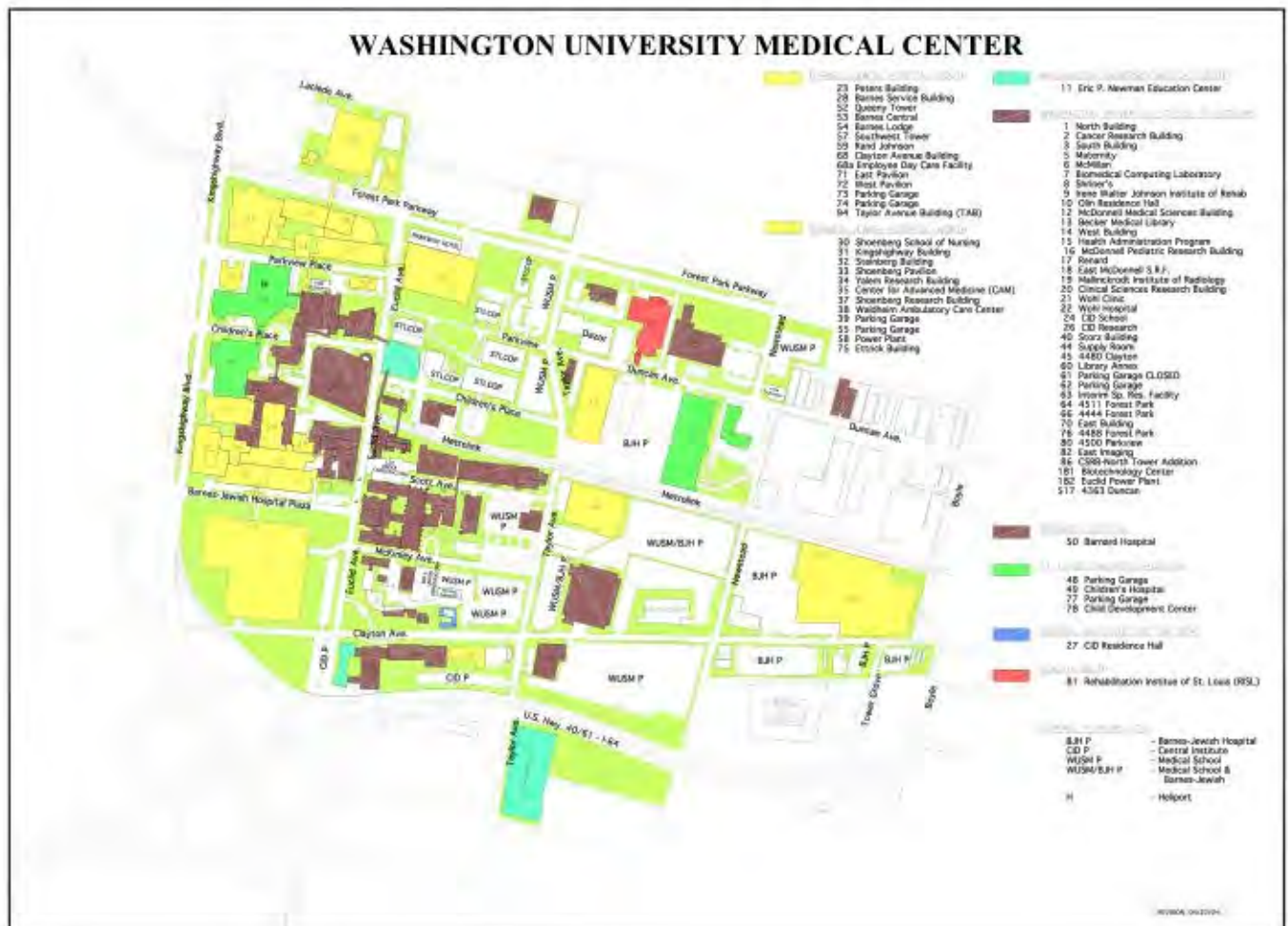
Second-Year Class:	2
First-Year Class:	9

*Master of Science in Genetic Epidemiology*

Second-Year Class:	9
First-Year Class:	7
Part-Time Students:	8
Certificate/SCND:	3

**Total : 997**

## Map



For additional information, see the map at: <http://visitor.wustl.edu/map/medical.html>

## **All Faculty**

### **Alphabetical List of Faculty**

**ELLIOT EFREM ABBEY, MD** Professor of Clinical Medicine, Internal Medicine, BA CORNELL UNIVERSITY 71, MD NEW YORK UNIVERSITY 75

**NABIL ABOUD, MD** Associate Professor of Anesthesiology, Anesthesiology, BA CHRISTIAN BROTHERS COLLEGE 63, MD SCHOOL NOT LISTED 70

**CHARLES C ABEL, MD** Assistant Professor of Clinical Medicine, Internal Medicine, BA WESTMINSTER COLLEGE 52, MD WASHINGTON UNIV IN ST. LOUIS 56

**DANA RAY ABENDSCHEIN, PHD** Associate Professor of Cell Biology and Physiology, Cell Biology & Physiology, BS STATE UNIVERSITY OF NEW YORK 74, PHD PURDUE UNIVERSITY 78

**DANA RAY ABENDSCHEIN, PHD** Associate Professor of Medicine, Internal Medicine, BS STATE UNIVERSITY OF NEW YORK 74, PHD PURDUE UNIVERSITY 78

**MARC BRUCE ABRAMS, DDENT** Instructor in Clinical Otolaryngology, Otolaryngology, BA UNIVERSITY OF MO KANSAS CITY 68, DDENT UNIVERSITY OF MO KANSAS CITY 72

**BARRY K ABRAMSON, MD** Instructor in Clinical Medicine, Internal Medicine, BA JOHNS HOPKINS UNIVERSITY 81, MD UNIVERSITY OF MIAMI 85

**YOUSSEF ABU-AMER, PHD** Associate Professor of Cell Biology and Physiology, Cell Biology & Physiology, BS SCHOOL NOT LISTED 85, MS SCHOOL NOT LISTED 87, PHD SCHOOL NOT LISTED 93

**YOUSSEF ABU-AMER, PHD** Associate Professor of Orthopaedic Surgery, Orthopaedic Surgery, BS SCHOOL NOT LISTED 85, MS SCHOOL NOT LISTED 87, PHD SCHOOL NOT LISTED 93

**ANINDA BHAT ACHARYA, MD** Instructor in Clinical Neurology, Neurology, BS UNIVERSITY OF KANSAS 92, MD UNIVERSITY OF KANSAS 96

**SAMUEL I ACHILEFU, PHD** Associate Professor of Radiology, Radiology, BS UNIVERSITY OF SCIENCE & TECH 84, MS UNIVERSITY OF IBADAN 86, PHD UNIVERSITY OF NANCY I 91

**Samuel I Achilefu** Siteman Cancer Center, Associate Professor of Radiology, Division of Radiological Sciences, Washington University School of Medicine, 1991-1993: Postdoctoral Research Fellow, Bioorganic/Inorganic Chemistry, Oxford University, Oxford, England, 1991: PhD, Chemistry, University of Nancy, France

**Joseph JH Ackerman** Siteman Cancer Center, Co-Director, Alvin J. Siteman Cancer Center Small Animal Cancer Imaging Core, William Greenleaf Eliot Professor and Chair of Chemistry, Washington University School of Medicine, 1977-1978: Postdoctoral Research Associate, Department of Chemistry, Colorado State University, Fort Collins, CO, 1978-1979: NIH Postdoctoral Fellow, Department of Biochemistry, University of Oxford, Oxford, England, 1972: PhD, Physical Chemistry, Colorado State University, Fort Collins, CO

**JOSEPH J.H. ACKERMAN, PHD** Professor of Radiology, Radiology, BA BOSTON UNIVERSITY 72, PHD COLORADO ST UNIVERSITY 77

**JOSEPH J.H. ACKERMAN, PHD** Research Professor of Chemistry in Medicine, Internal Medicine, BA BOSTON UNIVERSITY 72, PHD COLORADO ST UNIVERSITY 77

**GARY K ACKERS, PHD** Professor of Biochemistry and Molecular Biophysics, Biochem & Molec Biophysics, BS HARDING UNIVERSITY 61, PHD JOHNS HOPKINS UNIVERSITY 64

**SUSAN E ADAMS, MD, PHD, BS** Instructor in Clinical Pediatrics, Pediatrics, BA UNIVERSITY OF KANSAS 77, MD WASHINGTON UNIV IN ST. LOUIS 91, PHD UNIVERSITY OF KANSAS MEDICAL 84, BS UNIVERSITY OF KANSAS 77

**SUSAN R ADAMS, MD** Instructor in Clinical Medicine, Internal Medicine, BA CARLETON COLLEGE 85, MD UNIVERSITY OF MISSOURI 89

**WILLIAM S ADAMS, MD** Assistant Professor of Clinical Pediatrics, Pediatrics, BA WASHINGTON UNIV IN ST. LOUIS 85, MD UNIVERSITY OF MISSOURI 89

**DOUGLAS R ADKINS, MD** Associate Professor of Medicine, Internal Medicine, BS WRIGHT STATE UNIVERSITY 82, MD WRIGHT STATE UNIVERSITY 86

**Douglas R Adkins** Siteman Cancer Center, Associate Professor of Medicine, Division of Oncology, Section of Bone Marrow Transplantation and Stem Cell Biology, Washington University School of Medicine, 1986-1989: Internal Medicine, University of Texas Health Sciences Center, San Antonio, TX, 1989-1990: Fellowship in Medical Oncology/Hematology, University of Texas Health Sciences Center, San Antonio, TX, 1990-1992: Fellowship in Bone Marrow Transplantation, University of Texas Health Sciences Center, San Antonio, TX, 1986: MD, Wright State University School of Medicine, Dayton, OH, Primary Specialty: Bone Marrow Transplantation, Leukemia and Lymphoma, Board Certified:, 1990: American Board of Internal Medicine 1993: American Board of Internal Medicine, Medical Oncology

**BENARD C ADLER, MD** Professor Emeritus of Clinical Otolaryngology, Otolaryngology, BS WASHINGTON UNIV IN ST. LOUIS 37, MD WASHINGTON UNIV IN ST. LOUIS 37

**REBECCA L AFT, MD, PHD** Assistant Professor of Surgery (General Surgery), Surgery, BS UNIV OF WISCONSIN MADISON

78, MD WASHINGTON UNIV IN ST. LOUIS 92, PHD UNIV OF WISCONSIN MADISON 83

**Rebecca L Aft** Siteman Cancer Center, Assistant Professor of Surgery, Division of General Surgery, Section of Endocrine and Oncologic Surgery, Washington University School of Medicine, 1992-1995: Surgery, Barnes-Jewish Hospital and Washington University School of Medicine, St. Louis, MO, 1995-1996: Senior Registrar, Sydney University Royal North Shore Hospital, Sydney, Australia, 1996-1997: Surgery, Barnes-Jewish Hospital and Washington University School of Medicine, St. Louis, MO, 1992: MD, Washington University School of Medicine, St. Louis, MO, 1983: PhD, Oncology, McArdle Laboratory for Cancer Research, University of Wisconsin, Madison, WI, Primary Specialty: Breast Oncology, Board Certified:, 1998: American College of Surgery

**SIRAJUDDIN AGHA, MBBS** Assistant Professor of Anesthesiology, Anesthesiology, MBBS SCHOOL NOT LISTED 69

**ANN C AGNEW, MD** Assistant Professor of Clinical Medicine, Internal Medicine, BA UNIVERSITY OF MISSOURI 86, MD UNIVERSITY OF MISSOURI 89

**AQEEB AHMAD** Instructor in Clinical Psychiatry, Psychiatry

**SALMA AHMAD, MD** Instructor in Emergency Medicine in Medicine, Internal Medicine, MD SCHOOL NOT LISTED 70

**NAWAL MONA AHMED** Instructor in Clinical Otolaryngology (DDS), Otolaryngology

**GAIL G AHUMADA, MD** Associate Professor Emerita of Clinical Medicine, Internal Medicine, BA STANFORD UNIVERSITY 61, MA STANFORD UNIVERSITY 62, MD UNIVERSITY OF CALIFORNIA 72

**VENKATESH AIYAGARI, MD** Assistant Professor of Neurological Surgery, Neurological Surgery, MD SCHOOL NOT LISTED 87

**VENKATESH AIYAGARI, MD** Assistant Professor of Neurology, Neurology, MD SCHOOL NOT LISTED 87

**ERBIL AKBUDAK, PHD** Research Assistant Professor of Radiology, Radiology, BS BOGAZICI UNIVERSITY 88, MS WASHINGTON UNIV IN ST. LOUIS 92, PHD WASHINGTON UNIV IN ST. LOUIS 96

**ABDULLA AKFALY** Instructor in Clinical Medicine, Internal Medicine

**GUSTAV AKK, PHD** Research Assistant Professor of Anesthesiology, Anesthesiology, BS MOSCOW STATE UNIVERSITY 91, PHD STATE UNIV OF NY BUFFALO 97

**NATALIA S AKOPYANTS, PHD, MS** Assistant Research Scientist of Molecular Microbiology, Molecular Microbiology, MS MOSCOW STATE UNIVERSITY 80, PHD SCHOOL NOT LISTED 88, MS MOSCOW STATE UNIVERSITY 81

**MUHAMMAD TAHER AL-LOZI, MD** Associate Professor of Neurology, Neurology, BA UNIVERSITY OF PANJAB 76, MS UNIVERSITY OF JORDAN 85, MD UNIVERSITY OF PANJAB 80

**INGRID RENEE ALBERT, MD** Assistant Professor of Clinical Medicine (Dermatology), Internal Medicine, BA BARNARD COLLEGE 67, MD SCHOOL NOT LISTED 71

**JORGE M ALEGRE, MD** Instructor in Clinical Medicine, Internal Medicine, MD SCHOOL NOT LISTED 65

**MORRIS ALEX, MD** Assistant Professor Emeritus of Clinical Medicine, Internal Medicine, BS UNIVERSITY OF MISSOURI 42, MD WASHINGTON UNIV IN ST. LOUIS 43

**ASIM ALI** Instructor in Ophthalmology and Visual Sciences, Ophthalmology & Visual Sci

**MUHAMMAD A ALI, MD** Instructor in Clinical Medicine, Internal Medicine, MD SCHOOL NOT LISTED 85

**NABIEL ALKHOURI, MD** Instructor in Clinical Medicine, Internal Medicine, MD TISHREEN UNIV COLLEGE OF MED 86

**PAUL M ALLEN, PHD** Robert L. Kroc Professor of Pathology and Immunology, Pathology & Immunology, BS UNIVERSITY OF MICHIGAN 74, MS UNIVERSITY OF MICHIGAN 77, PHD UNIVERSITY OF MICHIGAN 81

**Paul M Allen** Siteman Cancer Center, Robert L. Kroc Professor of Pathology and Immunology, Center for Immunology, Washington University School of Medicine, 1981-1984: Research Fellow, Department of Pathology, Harvard Medical School, Boston, MA, 1977: MS, Immunology, University of Michigan, Ann Arbor, MI, 1981: PhD, Immunology, University of Michigan, Ann Arbor, MI

**HENRY W ALLHOFF, OD** Adjunct Instructor in Ophthalmology and Visual Sciences, Ophthalmology & Visual Sci, BA UNIVERSITY OF MISSOURI 76, OD ILLINOIS COLLEGE OF OPTOMETRY 81

**C. ROBERT ALMLI, PHD** Associate Professor of Neurology, Neurology, BS MICHIGAN STATE UNIVERSITY 66, MA MICHIGAN STATE UNIVERSITY 68, PHD MICHIGAN STATE UNIVERSITY 70

**C. ROBERT ALMLI, PHD** Associate Professor of Occupational Therapy, Occupational Therapy, BS MICHIGAN STATE UNIVERSITY 66, MA MICHIGAN STATE UNIVERSITY 68, PHD MICHIGAN STATE UNIVERSITY 70

**DAVID HERSHEL ALPERS, MD** William B Kountz Professor of Gerontology in Medicine, Internal Medicine, BA HARVARD UNIVERSITY 56, MD HARVARD UNIVERSITY 60

**DENIS IAN ALTMAN, MBBCH** Assistant Professor of Clinical Pediatrics, Pediatrics, MBBCH UNIVERSITY OF THE WITWATERSRA 75

**DENIS IAN ALTMAN, MBBCH** Associate Professor of Clinical Neurology, Neurology, MBBCH UNIVERSITY OF THE WITWATERSRA 75

**LOUIS ALTSHULER, DDENT, DDENT** Assistant Professor Emeritus of Clinical Otolaryngology, Otolaryngology, DDENT OHIO STATE UNIVERSITY 45, DDENT OHIO STATE UNIVERSITY 45

**LIZETTE ALVAREZ-MONTERO, MD** Instructor in Clinical Neurology, Neurology, BA WASHINGTON UNIV IN ST. LOUIS 87,

MD SCHOOL NOT LISTED 91

**MARYELLEN AMATO, MD** Instructor in Clinical Radiology, Radiology, BA NOTRE DAME COLLEGE 76, MD CASE WESTERN RESERVE UNIV 81

**PATRICIA J AMATO, MD** Assistant Professor of Clinical Pediatrics, Pediatrics, BS NOTRE DAME COLLEGE 79, MD SCHOOL NOT LISTED 82

**NAVINKUMAR J AMIN** Assistant Professor of Clinical Ophthalmology and Visual Sciences, Ophthalmology & Visual Sci, MS UNIVERSITY OF BOMBAY 66

**SHILPA S AMIN, MD** Instructor in Clinical Ophthalmology and Visual Sciences, Ophthalmology & Visual Sci, BA UNIVERSITY OF MO KANSAS CITY 94, MD UNIVERSITY OF MO KANSAS CITY 94

**AMIR ARSHAM AMINI, PHD** Associate Professor of Medicine, Internal Medicine, BS UNIVERSITY OF MASSACHUSETTS 83, MS UNIVERSITY OF MICHIGAN 84, PHD UNIVERSITY OF MICHIGAN 90

**MOHAMAD T AMJAD, MD** Professor of Clinical Pediatrics, Pediatrics, BS SCHOOL NOT LISTED 57, MD SCHOOL NOT LISTED 61

**PING AN** Research Assistant Professor of Biostatistics, Biostatistics

**SHRIKANT ANANT, PHD, MS** Assistant Professor of Medicine, Internal Medicine, BS UNIVERSITY OF MADRAS 81, MS UNIVERSITY OF MADRAS 84, PHD UNIVERSITY OF ILLINOIS 94, MS MICHIGAN STATE UNIVERSITY 86

**Shrikant Anant** Siteman Cancer Center, Research Associate Professor of Medicine, Division of Gastroenterology, Washington University School of Medicine, 1993-1995: Postdoctoral Research Fellow, Departments of Biochemistry and Molecular Biology and Medicine, University of Illinois, Chicago, IL, 1984: MSc, Medical Microbiology, University of Madras, India, 1986: MS, Microbiology, Michigan State University, East Lansing, MI, 1994: PhD, Molecular Genetics, University of Illinois, Chicago, IL

**CAROLYN J ANDERSON, PHD** Associate Professor of Molecular Biology and Pharmacology, Molec Bio & Pharmacology, BS UNIV OF WISCONSIN MADISON 85, PHD FLORIDA STATE UNIVERSITY 90

**CAROLYN J ANDERSON, PHD** Associate Professor of Radiology, Radiology, BS UNIV OF WISCONSIN MADISON 85, PHD FLORIDA STATE UNIVERSITY 90

**Carolyn J Anderson** Siteman Cancer Center, Associate Professor of Radiology, Division of Radiological Sciences, Washington University School of Medicine, 1990-1992: Research Associate, Postdoctoral with Michael J. Welch, PhD, Washington University School of Medicine, St. Louis, MO, 1990: PhD, Inorganic Chemistry, Florida State University, Tallahassee, FL

**CHARLES H ANDERSON, PHD** Research Professor of Neurobiology, Anatomy & Neurobiology, BS CALIFORNIA INSTITUTE TECHNOLOGY 57, PHD HARVARD UNIVERSITY 62

**DALE J ANDERSON, MD** Instructor in Clinical Psychiatry, Psychiatry, MD WASHINGTON UNIV IN ST. LOUIS 78

**DEE CLAIRE ANDERSON, MD** Professor of Radiology, Radiology, BS HENDRIX COLLEGE 67, MD WASHINGTON UNIV IN ST. LOUIS 71

**FRANK KIM ANDERSON, MD** Instructor in Clinical Medicine (Dermatology), Internal Medicine, BS UNIVERSITY OF ILLINOIS 76, MD NORTHWESTERN UNIVERSITY 80

**PAUL G ANDERSON, PHD** Director of Archives, Associate Professor of Biomedical Communication, Medical School Admin., BA UNIVERSITY OF MICHIGAN 64, MS WAYNE STATE UNIVERSITY 76, PHD WAYNE STATE UNIVERSITY 77

**RICHARD H ANDERSON, MD, PHD** Instructor in Clinical Psychiatry, Psychiatry, BS BRIGHAM YOUNG UNIVERSITY 82, MS BRIGHAM YOUNG UNIVERSITY 84, MD SAINT LOUIS UNIVERSITY 89, PHD BRIGHAM YOUNG UNIVERSITY 86

**SCOTT J ANDERSON, MD, PHD** Instructor in Clinical Medicine, Internal Medicine, BA UNIVERSITY OF CALIFORNIA 75, MD DUKE UNIVERSITY 82, PHD DUKE UNIVERSITY 81

**USHA P ANDLEY, PHD** Assistant Professor of Biochemistry and Molecular Biophysics, Biochem & Molec Biophysics, BS DELHI UNIVERSITY 70, MS DELHI UNIVERSITY 72, PHD SCHOOL NOT LISTED 77

**USHA P ANDLEY, PHD** Associate Professor of Ophthalmology and Visual Sciences, Ophthalmology & Visual Sci, BS DELHI UNIVERSITY 70, MS DELHI UNIVERSITY 72, PHD SCHOOL NOT LISTED 77

**DOROTHY A ANDRIOLE, MD** Assistant Dean for Student Affairs and Medical Education, Assoc Dean Curriculum, BA NEW YORK UNIVERSITY 76, MD NEW YORK UNIVERSITY 80

**DOROTHY A ANDRIOLE, MD** Assistant Professor of Surgery (General Surgery), Surgery, BA NEW YORK UNIVERSITY 76, MD NEW YORK UNIVERSITY 80

**GERALD L ANDRIOLE, MD** Professor of Surgery (Urologic Surgery), Surgery, BS PENNSYLVANIA STATE UNIVERSITY 76, MD SCHOOL NOT LISTED 78

**Gerald L Andriole** Siteman Cancer Center, Professor of Surgery, Chief of the Division of Urologic Surgery, Washington University School of Medicine, 1978-1980: Intern and Resident of Surgery, Strong Memorial Hospital, University of Rochester, Rochester, NY, 1980-1983: Resident of Urology, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, 1978: MD, Jefferson Medical College, Philadelphia, PA, Primary Specialty: Genitourinary Oncology, Board Certified:, 1979: National Board of Medical Examiners  
1985: American Board of Urology, Recertified, 1992

**MICHAEL J ANDRITSOS** Instructor in Anesthesiology, Anesthesiology

**DORA ANGELAKI, PHD** Professor of Neurobiology, Anatomy & Neurobiology, BS SCHOOL NOT LISTED 85, MS UNIVERSITY

OF MINNESOTA 89, PHD UNIVERSITY OF MINNESOTA 91

**ANDREY P ANOKHIN, PHD** Research Assistant Professor of Psychiatry, Psychiatry, MS MOSCOW STATE UNIVERSITY 81, PHD SCHOOL NOT LISTED 87

**Andrey P Anokhin** Siteman Cancer Center, Instructor of Psychiatry, Washington University School of Medicine, 1992-1994: Head of Neuropsychogenetics Research Unit, Institute of Man, Russian Academy of Sciences, 1996-1999: Postdoctoral Fellow, Department of Psychiatry, Washington University School of Medicine, 1989-1991: Research Fellow of the Alexander von Humboldt Foundation, Institute of Human Genetics and Anthropology, Heidelberg University, Germany, 1981: MS, Human Biology, Moscow State University, Moscow, Russia, 1987: PhD, Psychology and Psychophysiology, Institute of Psychology, Russian Academy of Sciences

**SHARMA ANSHUMAN, MD** Assistant Professor of Anesthesiology, Anesthesiology, BA SCHOOL NOT LISTED 87, MD INSTITUTE OF MEDICAL SCIENCE 90

**E. JAMES ANTHONY, MD, PHD** Professor Emeritus of Psychiatry (Child Psychiatry), Psychiatry, BS SCHOOL NOT LISTED 38, MS SCHOOL NOT LISTED 41, MD SCHOOL NOT LISTED 49, PHD SCHOOL NOT LISTED 48

**JOHN K APPELBAUM, MD** Assistant Professor of Clinical Obstetrics and Gynecology, Obstetrics & Gynecology, BA SAINT LOUIS UNIVERSITY 80, MD WASHINGTON UNIV IN ST. LOUIS 84

**MURRAY HOWARD APPELBAUM, DDENT** Instructor in Clinical Otolaryngology (DMD), Otolaryngology, DDENT WASHINGTON UNIV IN ST. LOUIS 83

**RAJENDRA APTE** Assistant Professor of Ophthalmology and Visual Sciences, Ophthalmology & Visual Sci

**TOSHIYUKI ARAKI, MD, PHD** Research Assistant Professor of Pathology and Immunology, Pathology & Immunology, MD SCHOOL NOT LISTED 89, PHD SCHOOL NOT LISTED 93

**SCOTT J ARBAUGH, MD** Instructor in Clinical Psychiatry, Psychiatry, BA SAINT LOUIS UNIVERSITY 80, MD SAINT LOUIS UNIVERSITY 85

**Jeffrey M Arbeit** Siteman Cancer Center, Professor of Surgery, Division of Urologic Surgery, Washington University School of Medicine, 1976-1978: Intern/resident, University of Colorado, Denver, 1978-1981: Clinical associate, Surgery Branch, National Cancer Institute, Bethesda, Md., 1981-1984: Resident/chief resident, University of Colorado, Denver, 1984-1986: Fellow, surgical oncology, Memorial Sloan-Kettering Cancer Center, New York, 1976: MD, Rush Medical College, Chicago, Board Certified:, 1985: American Board of Surgery; recertified 1995

**JEFFREY MICHAEL ARBEIT, MD** Professor of Surgery (Urologic Surgery), Surgery, MD RUSH UNIVERSITY 76

**Robert H Arch** Siteman Cancer Center, Assistant Professor of Medicine, Pulmonary & Critical Care Medicine, Washington University School of Medicine, 1994-1995: Postdoctoral, Department of Immune Regulation and Tumor Defense, German Cancer Research Center, Heidelberg, Germany, 1996-1998: Postdoctoral, Howard Hughes Medical Institute, Gwen Knapp Center for Lupus and Immunology Research, University of Chicago, Chicago, IL, 1994: PhD, Immunology and Cell Biology, University of WYrzburg, Germany

**ROBERT H. ARCH, PHD** Assistant Professor of Medicine, Internal Medicine, BS UNIVERSITY OF WUERZBURG 87, MS UNIVERSITY OF WUERZBURG 91, PHD UNIVERSITY OF WUERZBURG 94

**ROBERT H. ARCH, PHD** Assistant Professor of Pathology and Immunology, Pathology & Immunology, BS UNIVERSITY OF WUERZBURG 87, MS UNIVERSITY OF WUERZBURG 91, PHD UNIVERSITY OF WUERZBURG 94

**AHMAD BEHESHTI ARDEKANI, MD** Assistant Professor of Clinical Psychiatry, Psychiatry, MD SCHOOL NOT LISTED 74

**MAX QUIRIN ARENS, PHD** Associate Professor of Pediatrics, Pediatrics, PHD VA POLYTECHNIC INST & STATE U 72

**KENNETH J ARNOLD, MD** Assistant Professor of Clinical Surgery (General Surgery), Surgery, BA UNIVERSITY OF NOTRE DAME 64, MD WASHINGTON UNIV IN ST. LOUIS 68

**SUSAN T ARNOLD, MD** Assistant Professor of Pediatrics, Pediatrics, BA WESLEYAN UNIVERSITY 84, MD CORNELL UNIVERSITY 88

**SUSAN T ARNOLD, MD** Associate Professor of Neurology, Neurology, BA WESLEYAN UNIVERSITY 84, MD CORNELL UNIVERSITY 88

**JEROME M ARONBERG, MD** Assistant Professor of Clinical Medicine (Dermatology), Internal Medicine, BA WASHINGTON UNIV IN ST. LOUIS 67, MD WASHINGTON UNIV IN ST. LOUIS 71

**LAWRENCE MILTON ARONBERG, MD** Assistant Professor of Clinical Surgery (Urologic Surgery), Surgery, BA WASHINGTON UNIV IN ST. LOUIS 32, MD WASHINGTON UNIV IN ST. LOUIS 36

**NEVA P ARRIBAS, MD, AA** Associate Professor Emerita of Clinical Ophthalmology and Visual Sciences, Ophthalmology & Visual Sci, MD SCHOOL NOT LISTED 54, AA SCHOOL NOT LISTED 49

**JENNIFER L. ARTER** Instructor in Clinical Pediatrics, Pediatrics, BS UNIVERSITY OF IOWA 93

**PHILLIP V. ASARO** Assistant Professor of Emergency Medicine in Medicine (Pending Executive Faculty Approval), Internal Medicine

**FRANK ASHALL, MD, PHD** Instructor in Clinical Medicine, Internal Medicine, BA OXFORD UNIVERSITY 80, MD SAINT LOUIS UNIVERSITY 98, PHD OXFORD UNIVERSITY 82

**JOHN PATTERSON ATKINSON, MD** Professor of Molecular Microbiology, Molecular Microbiology, BA UNIVERSITY OF KANSAS 65, MD UNIVERSITY OF KANSAS 69

**JOHN PATTERSON ATKINSON, MD** Samuel Grant Professor of Medicine, Internal Medicine, BA UNIVERSITY OF KANSAS

65, MD UNIVERSITY OF KANSAS 69

**CHANDRA AUBIN, MD** Instructor in Emergency Medicine in Medicine, Internal Medicine, BA UNIVERSITY OF MISSOURI 83, MD UNIVERSITY OF MISSOURI 83

**VORACHART AUETHAVEKIAT, MD** Instructor in Medicine, Internal Medicine, MD SCHOOL NOT LISTED 81

**PAUL F AUSTIN, MD** Assistant Professor of Surgery (Urologic Surgery), Surgery, BA MURRAY ST UNIVERSITY 87, MD UNIVERSITY OF KENTUCKY 91

**Paul F Austin** Siteman Cancer Center, Assistant Professor of Surgery, Division of Urologic Surgery, Washington University School of Medicine, 1991-1993: General Surgery, University of South Florida, College of Medicine, Tampa, FL, 1993-1997: Urologic Surgery, University of South Florida, College of Medicine, Tampa, FL, 1997-1999: Pediatric Urology Fellowship, Indiana University School of Medicine, James Whitcomb Riley Hospital for Children, Indianapolis, IN, 1991: MD, University of Kentucky, College of Medicine, Lexington, KY, Primary Specialty: Pediatric Urology, Board Certified:, 1997: American Board of Urology

**JAMES G AVERY, MD** Assistant Professor of Clinical Medicine, Internal Medicine, BA WASHINGTON UNIV IN ST. LOUIS 86, MD UNIVERSITY OF TENNESSEE 90

**MICHAEL SIMON AVIDAN, MBBCH** Assistant Professor of Anesthesiology, Anesthesiology, MBBCH UNIVERSITY OF THE WITWATERSRA 91

**MICHAEL SIMON AVIDAN, MBBCH** Instructor in Surgery (Cardiothoracic Surgery), Surgery, MBBCH UNIVERSITY OF THE WITWATERSRA 91

**SYLVIA AWADALLA, MD** Associate Professor of Clinical Neurology, Neurology, MD OHIO STATE UNIVERSITY 85

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